High-Power 1180-nm GaInNAs DBR Laser Diodes

We report high-power 1180-nm GaInNAs distributed Bragg reflector laser diodes with and without a tapered amplifying section. The untapered and tapered components reached room temperature output powers of 655 mW and 4.04 W, respectively. The diodes exhibited narrow linewidth emission with side-mode suppression ratios in the range of 50 dB for a broad range of operating current, extending up to 2 A for the untapered component and 10 A for the tapered component.

The high output power is rendered possible by the use of a high quality GaInNAs-based quantum well gain region, which allows for lower strain and better carrier confinement compared with traditional GaInAs quantum wells. The development opens new opportunities for the power scaling of frequency-doubled lasers with emission at yellow–orange wavelengths.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: ORC, Research group: Surface Science, Okmetic Oyj, Norlase ApS, Denmark Technical University DTU
Authors: Aho, A. T., Viheriälä, J., Korpijärvi, V., Koskinen, M., Virtanen, H., Christensen, M., Uusitalo, T., Lahtonen, K., Valden, M., Guina, M.
Number of pages: 4
Pages: 2023-2026
Publication date: 1 Dec 2017
Peer-reviewed: Yes

Publication information
Journal: IEEE Photonics Technology Letters
Volume: 29
Issue number: 23
ISSN (Print): 1041-1135

Ratings:
Scopus rating (2016): CiteScore 2.52 SJR 1.018 SNIP 1.279
Scopus rating (2015): SJR 1.263 SNIP 1.327 CiteScore 2.62
Scopus rating (2014): SJR 1.461 SNIP 1.614 CiteScore 2.78
Scopus rating (2013): SJR 1.487 SNIP 1.547 CiteScore 2.95
Scopus rating (2012): SJR 1.623 SNIP 1.706 CiteScore 2.46
Scopus rating (2011): SJR 1.51 SNIP 2.012 CiteScore 2.48
Scopus rating (2010): SJR 1.474 SNIP 1.623
Scopus rating (2009): SJR 1.775 SNIP 1.804
Scopus rating (2008): SJR 2.081 SNIP 1.818
Scopus rating (2007): SJR 2.345 SNIP 1.566
Scopus rating (2006): SJR 2.112 SNIP 1.884
Scopus rating (2005): SJR 2.97 SNIP 2.454
Scopus rating (2004): SJR 3.286 SNIP 2.716
Scopus rating (2003): SJR 3.44 SNIP 2.467
Scopus rating (2002): SJR 3.566 SNIP 2.117
Scopus rating (2001): SJR 3.519 SNIP 1.678
Scopus rating (2000): SJR 2.345 SNIP 1.202
Scopus rating (1999): SJR 2.44 SNIP 1.302
Original language: English
ASJC Scopus subject areas: Atomic and Molecular Physics, and Optics
Keywords: High power, distributed Bragg reflector laser, frequency doubling, Coating(s)

Electronic versions:
08060506
DOIs:
10.1109/LPT.2017.2760038
Links:
http://urn.fi/URN:NBN:fi:tty-201711072119

Bibliographical note
INT="Koskinen, Mervi"
Research output: Scientific - peer-review › Article
Effect of ZnO addition and of alpha particle irradiation on various properties of Er$^{3+}$, Yb$^{3+}$ doped phosphate glasses

New Er$^{3+}$, Yb$^{3+}$ codoped phosphate glasses with the (98-x) (0.50P$_{2}$O$_{5}$-0.40SrO-0.10Na$_{2}$O) -0.5Er$_{2}$O$_{3}$-1.5Yb$_{2}$O$_{3}$-xZnO (in mol %) composition were prepared by melting process with up to 10 mol % of ZnO. The impact of the changes in the glass composition on the thermal, optical, structural properties was investigated. Using IR and Raman spectroscopies, we confirmed that the addition of ZnO up to 10 mol % leads to a depolymerization of the network without having a significant impact on the Er$^{3+}$ and Yb$^{3+}$ sites. We also discuss the effect of alpha particles irradiation. The glass with 2.5 mol % of ZnO was irradiated with 3 MeV alpha particles and a total fluence of 10$^{12}$ α/cm$^2$. After irradiation, this glass exhibits surface expansion (measured at ~200 nm, 1.5 months after the irradiation) and an increase in the surface roughness. The alpha particles irradiation is suspected to lead to changes in the spectroscopic properties of the glass. Finally, the photo-response of the glass was found to be reversible.
Decreasing Defect-State Density of Al₂O₃/GaₓIn₁−ₓAs Device Interfaces with InOₓ Structures

Control of defect densities at insulator/GaₓIn₁−ₓAs interfaces is essential for optimal operation of various devices like transistors and infrared detectors to suppress, for example, nonradiative recombination, Fermi-level pinning, and leakage currents. It is reported that a thin InOₓ interface layer is useful to limit the formation of these defects by showing effect of InOₓ on quantum efficiency of Ga0.45In0.55As detector and on photoluminescence of GaAs. A study of the Al₂O₃/GaAs interface via hard X-ray synchrotron photoelectron spectroscopy reveals chemical structure changes at the interface induced by this beneficial InOₓ incorporation: the InOₓ sheet acts as an O diffusion barrier that prevents oxidation of GaAs and concomitant As bond rupture.

General information
State: E-pub ahead of print
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: ORC, Department of Physics and Astronomy, University of Turku, Helmholtz Zentrum Berlin Mat & Energie, Helmholtz Association, Helmholtz-Zentrum Berlin (HZB)
Number of pages: 7
Publication date: 19 Sep 2017
Peer-reviewed: Yes

Publication information
Journal: Advanced Materials Interfaces
ISSN (Print): 2196-7350
Scopus rating (2016): CiteScore 3.57 SJR 1.451 SNIP 0.819
Scopus rating (2015): SJR 1.131 SNIP 0.63 CiteScore 2.47
Original language: English
Keywords: defects, GaAs, HAXPES, interface, oxide
ASJC Scopus subject areas: Physics and Astronomy(all)
DOIs: 10.1002/admi.201700722
Research output: Scientific - peer-review › Article
**Tuning Localized Surface Plasmon Resonances by Self-Assembly in Multi-Metal Nanostructures**

Block copolymers together with conventional nanolithography offer an intriguing possibility to realize complex photonic nanostructures that would otherwise be impossible or extremely difficult to manufacture. Sub-wavelength nanostructures made of noble metals exhibit localized surface plasmon resonances that can be tailored by tuning the geometry of the structures. We demonstrate that combining plasmonic nanoarrays with block copolymer self-assembly allows realization of multi-metal structures that display altered optical behavior.

A high speed electron-beam lithography technique (Dots-On-The-Fly) was used to fabricate arrays of thin, plasmonic gold structures, which then acted as a directing template for the self-assembly of asymmetric poly( styrene-b-2-vinyl pyridine) (PS-P2VP). Solvothermal annealing resulted in the PS-P2VP assembling in the gap regions of the plasmonic structures. The P2VP domains could then be converted into a variety of metals such as Au, Ag or Pt to populate the gap with plasmonic nanoparticles. 3D and 2D computational modeling was used to estimate the effects of geometry and material combinations on the far field spectrum and the local field-enhancement in the gap. Self-assembled multimaterial plasmonic devices have various applications in near field sensing, nonlinear optical interactions and photocatalysis.

**General information**
State: Published
Organisations: Photonics, Research group: Nanophotonics
Authors: Hulkkonen, H., Salminen, T., Rasappa, S., Niemi, T.
Publication date: 17 Sep 2017
Peer-reviewed: Unknown
Research output: Scientific › Paper, poster or abstract

**Field Emission from Self-Catalyzed GaAs Nanowires**
We report observations of field emission from self-catalyzed GaAs nanowires grown on Si (111). The measurements were taken inside a scanning electron microscope chamber with a nano-controlled tungsten tip functioning as anode. Experimental data were analyzed in the framework of the Fowler-Nordheim theory. We demonstrate stable current up to 10−7 A emitted from the tip of single nanowire, with a field enhancement factor $\beta$ of up to 112 at anode-cathode distance $d = 350$ nm. A linear dependence of $\beta$ on the anode-cathode distance was found. We also show that the presence of a Ga catalyst droplet suppresses the emission of current from the nanowire tip. This allowed for the detection of field emission from the nanowire sidewalls, which occurred with a reduced field enhancement factor and stability. This study further extends GaAs technology to vacuum electronics applications.

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: ORC
Authors: Giubileo, F., Di Bartolomeo, A., Iemmo, L., Luongo, G., Passacantando, M., Koivusalo, E., Hakkarainen, T., Guina, M.
Publication date: 16 Sep 2017
Peer-reviewed: Yes

**Publication information**
Journal: Nanomaterials
Volume: 7
Issue number: 9
Article number: 275
ISSN (Print): 2079-4991
Original language: English
Electronic versions:
nanomaterials-07-00275
DOIs:
10.3390/nano7090275
Links:
http://urn.fi/URN:NBN:fi tty-201709201939
Research output: Scientific › peer-review › Article

**Nanocomposite Polypropylene For DC Cables And Capacitors: A New European Project**
This paper presents the scientific background of a new European project, GRIDABLE, which was launched at the beginning of 2017 and has to deliver results in manufacturing and characterization of LV-MV capacitors and MV-HV cables for DC application. The innovation is in the development of nanostructured materials based on polypropylene and silica, and the relevant capacitor and cable manufacturing procedures. The initial results regarding the electrical properties
of PP-SiO2 materials, which have brought to the proposal of this project, are presented in this paper, focusing on breakdown strength and space charge measurements performed on nanofilled PP films for capacitors.

**General information**
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Electrical Energy Engineering, Research area: Power engineering, Research group: High voltage engineering, University of Bologna, Italy, VTT Technical Research Centre of Finland
Authors: Montanari, G. C., Seri, P., Karttunen, M., Paajanen, M., Lahti, K., Rytöluoto, I.
Number of pages: 4
Pages: 433-436
Publication date: 15 Sep 2017

**Host publication information**
Title of host publication: Proceeding of the 8th international symposium on electrical insulating materials (ISEIM)
Volume: 1
Place of publication: Toyahashi City, Japan
Publisher: International symposium on electrical insulating materials (ISEIM)
ISBN (Print): 978-4-88686-099-6
ISBN (Electronic): 978-4-88686-100-9
Keywords: HVDC, space charge, nanocomposite, DC cable, Capacitor, SiO2
Research output: Scientific - peer-review  Conference contribution

The Effect of Ultrasonic Dispersion on the Surface Chemistry of Carbon Nanotubes in the Jeffamine D-230 Polyetheramine Medium

This paper studies changes in the surface chemistry of carbon nanotubes (CNTs) where they are under ultrasonication process in Jeffamine D-230 polyetheramine medium. Jeffamine is used as a curing agent in the nanocomposite manufacturing process. In the nanocomposite technology, ultrasonication process is employed as a method for dispersion of CNTs in a suspension. This research tries to investigate the effect of ultrasonic dispersion with different time and energy on the surface chemistry of CNTs by Fourier transform infrared spectroscopy. The results show ultrasonication of CNTs in the Jeffamine medium leads to significant oxidation and hydration along creating new chemical bonds on the CNTs surface.

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Materials Science, Research group: Plastics and Elastomer Technology
Authors: Shahshahan, M., Keinänen, P., Vuorinen, J.
Number of pages: 4
Pages: 741-744
Publication date: 1 Sep 2017
Peer-reviewed: Yes

**Publication information**
Journal: IEEE Transactions on Nanotechnology
Volume: 16
Issue number: 5
ISSN (Print): 1536-125X
Ratings:
Scopus rating (2016): CiteScore 2.63 SJR 0.611 SNIP 1.191
Scopus rating (2015): SJR 0.667 SNIP 1.11 CiteScore 2.23
Scopus rating (2014): SJR 0.748 SNIP 1.181 CiteScore 2.26
Scopus rating (2013): SJR 0.703 SNIP 1.121 CiteScore 2.12
Scopus rating (2012): SJR 0.898 SNIP 1.164 CiteScore 2.21
Scopus rating (2011): SJR 1.232 SNIP 1.346 CiteScore 2.65
Scopus rating (2010): SJR 1.164 SNIP 0.978
Scopus rating (2009): SJR 1.273 SNIP 1.081
Scopus rating (2008): SJR 1.388 SNIP 1.341
Scopus rating (2006): SJR 1.559 SNIP 1.354
Scopus rating (2005): SJR 2.404 SNIP 2.02
Scopus rating (2004): SJR 2.134 SNIP 2.942
Distributed feedback lasers with alternating laterally coupled ridge-waveguide surface gratings

Distributed feedback lasers with laterally coupled ridge-waveguide surface gratings having the protrusions placed alternately on the lateral sides of the ridge are demonstrated. This configuration enables easier-to-fabricate wider trenches than in the gratings with protrusions placed symmetrically on both sides of the ridge. The design strategy and coupling coefficient calculations are discussed. The output characteristics of fabricated lasers show lower threshold currents and higher slope efficiencies for devices with first order alternating gratings than for those with third-order symmetric gratings having comparable grating trench widths and similar coupling coefficients.
Characterization of bidisperse magnetorheological fluids utilizing maghemite (γ-Fe2O3) nanoparticles synthetized by flame spray pyrolysis

In this study we have used liquid flame spray (LFS) process to synthetize γ-Fe2O3 nanoparticles of two different average sizes. Different sized nanoparticles were generated with two different liquid precursor feed rates in the spray process, higher feed rate resulting in larger nanoparticles with higher saturation magnetization. The nanoparticles were used in bidisperse magnetorheological fluids to substitute 5% of the micron sized carbonyl iron particles. To our knowledge this is the first time particles synthetized by the LFS method have been used in magnetorheological fluids. The bidisperse fluids showed significantly improved sedimentation stability compared to a monodisperse suspension with the same solid concentration. The tradeoff was an increased viscosity without magnetic field. The effect of the nanoparticles on the rheological properties under external magnetic field was modest. Finally, the dynamic oscillatory testing was used to evaluate the structural changes in the fluids under magnetic field. The addition of nanoparticles decreased the elastic portion of the deformation and increased the viscous portion.

General information

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Materials Science, Research group: Plastics and Elastomer Technology, Photonics, Research group: Nanophotonics, Physics, Research group: Aerosol Physics, Research group: Aerosol Synthesis
Authors: Jönkkäri, I., Sorvali, M., Huhtinen, H., Sarlin, E., Salminen, T., Haapanen, J., Mäkelä, J. M., Vuorinen, J.
Number of pages: 10
Publication date: 9 Aug 2017
Peer-reviewed: Yes

Publication information

Journal: Smart Materials and Structures
Volume: 26
Issue number: 9
ISSN (Print): 0964-1726
Ratings:
Scopus rating (2016): CiteScore 3.1 SJR 0.976 SNIP 1.547
Scopus rating (2015): SJR 1.156 SNIP 1.698 CiteScore 3.03
Scopus rating (2014): SJR 1.254 SNIP 1.869 CiteScore 2.9
Scopus rating (2013): SJR 1.023 SNIP 1.915 CiteScore 2.61
Scopus rating (2012): SJR 1.016 SNIP 1.764 CiteScore 2.19
Scopus rating (2011): SJR 1.196 SNIP 1.972 CiteScore 2.53
Scopus rating (2010): SJR 1.266 SNIP 1.889
Scopus rating (2009): SJR 1.143 SNIP 1.836
Scopus rating (2008): SJR 1.085 SNIP 1.67
Scopus rating (2007): SJR 1.163 SNIP 1.904
Scopus rating (2006): SJR 1.007 SNIP 2.002
Scopus rating (2005): SJR 1.023 SNIP 1.903
Scopus rating (2004): SJR 1.264 SNIP 2.016
Scopus rating (2003): SJR 1.558 SNIP 1.69
Scopus rating (2002): SJR 1.384 SNIP 1.978
Scopus rating (2001): SJR 1.137 SNIP 2.241
Scopus rating (2000): SJR 1.053 SNIP 1.447
Scopus rating (1999): SJR 1.451 SNIP 1.247
Original language: English
DOI:
10.1088/1361-665X/aa7ff7d

Sub-Poissonian narrowing of length distributions realized in Ga-catalyzed GaAs nanowires

Herein, we present experimental data on the record length uniformity within the ensembles of semiconductor nanowires. The length distributions of Ga-catalyzed GaAs nanowires obtained by cost-effective lithography-free technique on silicon substrates systematically feature a pronounced sub-Poissonian character. For example, nanowires with the mean length of 2480 nm show a length distribution variance of only 367 nm², which is more than twice smaller than the Poisson variance of 808 nm² for this mean length (with = 0.326 nm as the height of GaAs monolayer). For 5125 nm mean length, the measured variance is 1200 nm² against 1671 nm² for Poisson distribution. A supporting model to explain the
experimental findings is proposed. We speculate that the fluctuation-induced broadening of the length distributions is
suppressed by nucleation antibunching, the effect which is commonly observed in individual vapor-liquid-solid nanowires
but has never been seen for their ensembles. Without kinetic fluctuations, the two remaining effects contributing to the
length distribution width are the nucleation randomness for nanowires emerging from the substrate and the shadowing
effect on long enough nanowires. This explains an interesting time evolution of the variance that saturates after a short
incubation stage but then starts increasing again due to shadowing, remaining, however, smaller than the Poisson value
for sufficiently long time.

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: ORC
Authors: Koivusalo, E., Hakkarainen, T., Guina, M., Dubrovskii, V. G.
Pages: 5350-5355
Publication date: 7 Aug 2017
Peer-reviewed: Yes

**Publication information**
Journal: Nano Letters
Volume: 17
Issue number: 9
ISSN (Print): 1530-6984
Ratings:
Scopus rating (2016): CiteScore 13.4 SJR 7.983 SNIP 2.881
Scopus rating (2015): SJR 8.62 SNIP 3.353 CiteScore 14.76
Scopus rating (2013): SJR 9.085 SNIP 3.41 CiteScore 14.23
Scopus rating (2012): SJR 10.253 SNIP 3.615 CiteScore 13.78
Scopus rating (2010): SJR 9.32 SNIP 3.282
Scopus rating (2009): SJR 7.868 SNIP 2.891
Scopus rating (2008): SJR 7.649 SNIP 2.991
Scopus rating (2007): SJR 6.983 SNIP 2.954
Scopus rating (2005): SJR 6.698 SNIP 2.86
Scopus rating (2004): SJR 5.259 SNIP 2.336
Scopus rating (2003): SJR 3.419 SNIP 2.07
Scopus rating (2002): SJR 2.417 SNIP 1.726
Original language: English
DOIs: 10.1021/acs.nanolett.7b01766
Research output: Scientific - peer-review › Article

*Cavity enhanced absorption spectroscopy in the mid-infrared using a supercontinuum source*
We demonstrate incoherent broadband cavity enhanced absorption spectroscopy in the mid-infrared wavelength range
from 3000 to 3450 nm using an all-fiber based supercontinuum source. Multi-component gas detection is performed, and
the concentrations of acetylene and methane are retrieved with sub-ppm accuracy. A linear response to nominal gas
concentrations is observed, demonstrating the feasibility of the method for sensing applications.

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research area: Optics, Research group: Applied Optics, Research group: Ultrafast Optics,
Institut FEMTO-ST, UMR 6174 CNRS-Université de Franche-Comté
Authors: Amiot, C., Aalto, A., Ryczkowski, P., Toivonen, J., Genty, G.
Number of pages: 4
Publication date: Aug 2017
Peer-reviewed: Yes

**Publication information**
Volume: 111
Probing the longitudinal electric field of Bessel beams using second-harmonic generation from nano-objects

Non-diffractive Bessel beams are receiving significant interest in optical microscopy due to their remarkably large depth of field. For example, studies have shown the superiority of Bessel beams over Gaussian beams for volumetric imaging of three-dimensionally thick or extended samples. However, the vectorial aspects of the focal fields of Bessel beams are generally obscured when traditional methods are used to characterize their three-dimensional point-spread function in space, which contains contributions from all optical field components. Here, we show experimentally the three-dimensional spatial distribution and enhanced depth of field of the longitudinal electric field components of a focused linearly-polarized Bessel beam. This is done through second-harmonic generation from well-defined vertically-aligned gallium-arsenide nanowires, whose second-order response is primarily driven by the longitudinal fields at the beam focus.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research area: Optics, Research group: Nonlinear Optics
Authors: Turquet, L., Kakko, J., Karvonen, L., Jiang, H., Kauppinen, E., Lipsanen, H., Kauranen, M., Bautista, G.
Publication date: 21 Jul 2017
Peer-reviewed: Yes

Publication Information
Journal: Journal of Optics
Volume: 19
Issue number: 8
Article number: 084011
ISSN (Print): 2040-8978

Ratings:
Scopus rating (2016): CiteScore 1.63 SJR 0.673 SNIP 0.746
Scopus rating (2015): SJR 0.875 SNIP 0.831 CiteScore 1.44
Scopus rating (2014): SJR 1.102 SNIP 1.041 CiteScore 1.63
Scopus rating (2013): SJR 1.173 SNIP 1.235 CiteScore 1.64
Scopus rating (2012): SJR 1.296 SNIP 1.121 CiteScore 1.71
Scopus rating (2011): SJR 1.085 SNIP 1.267 CiteScore 1.37
Scopus rating (2010): SJR 1.085 SNIP 1.115
Scopus rating (2009): SJR 1 SNIP 1.057
Stabilization of femtosecond optical parametric oscillators for infrared frequency comb generation

A synchronously pumped optical parametric oscillator (SP-OPO) is one of the most common techniques to generate femtosecond frequency combs in the mid-infrared region. Stable long-term operation of an SP-OPO requires active locking of the OPO resonator round-trip time to the pump pulse interval. A simple modulation-free locking method based on stabilization of narrow-band frequency-doubled power of the SP-OPO output comb is demonstrated in this Letter. The method relies on the strong dependency of frequency-doubled power on spectral shape of the comb, leading to better stability of the comb envelope spectrum than the commonly used dither-and-lock method.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, University of Helsinki, Department of Chemistry
Authors: Vainio, M., Halonen, L.
Number of pages: 4
Pages: 2722-2725
Publication date: 7 Jul 2017
Peer-reviewed: Yes

Publication information
Journal: Optics Letters
Volume: 42
Issue number: 14
ISSN (Print): 0146-9592
Ratings:
Scopus rating (2016): SJR 1.864 SNIP 1.658 CiteScore 3.54
Scopus rating (2015): SJR 2.142 SNIP 1.642 CiteScore 3.53
Scopus rating (2014): SJR 2.497 SNIP 2.056 CiteScore 3.86
Scopus rating (2013): SJR 2.458 SNIP 2.095 CiteScore 3.95
Scopus rating (2012): SJR 2.596 SNIP 1.95 CiteScore 3.52
Scopus rating (2011): SJR 2.518 SNIP 2.475 CiteScore 3.69
Scopus rating (2010): SJR 2.669 SNIP 2.293
Scopus rating (2009): SJR 3.167 SNIP 2.665
Scopus rating (2008): SJR 3.408 SNIP 2.378
Scopus rating (2007): SJR 3.489 SNIP 2.102
Scopus rating (2006): SJR 3.143 SNIP 2.334
Scopus rating (2005): SJR 3.251 SNIP 2.483
Scopus rating (2004): SJR 3.521 SNIP 2.718
Scopus rating (2003): SJR 3.708 SNIP 2.573
Scopus rating (2002): SJR 3.702 SNIP 2.39
Scopus rating (2001): SJR 3.62 SNIP 2.244
Scopus rating (2000): SJR 3.416 SNIP 1.705
Scopus rating (1999): SJR 4.044 SNIP 1.699
Original language: English
DOIs: 10.1088/2040-8986/aa7722
Research output: Scientific - peer-review › Article
Progress in Power Scaling and Wavelength Coverage of VECSELs

Photo-acoustic spectroscopy revealing resonant absorption of self-assembled GaAs-based nanowires

III–V semiconductors nanowires (NW) have recently attracted a significant interest for their potential application in the development of high efficiency, highly-integrated photonic devices and in particular for the possibility to integrate direct bandgap materials with silicon-based devices. Here we report the absorbance properties of GaAs-AlGaAs-GaAs core-shell-supershell NWs using photo-acoustic spectroscopy (PAS) measurements in the spectral range from 300 nm to 1100 nm wavelengths. The NWs were fabricated by self-catalyzed growth on Si substrates and their dimensions (length ~5 μm, diameter ~140–150 nm) allow for the coupling of the incident light to the guided modes in near-infrared (IR) part of the spectrum. This coupling results in resonant absorption peaks in the visible and near IR clearly evidenced by PAS. The analysis reveal broadening of the resonant absorption peaks arising from the NW size distribution and the interaction with other NWs. The results show that the PAS technique, directly providing scattering independent absorption spectra, is a very useful tool for the characterization and investigation of vertical NWs as well as for the design of NW ensembles for photonic applications, such as Si-integrated light sources, solar cells, and wavelength dependent photodetectors.

Transverse structure optimization of distributed feedback and distributed Bragg reflector lasers with surface gratings

Two figures of merit for single transverse mode operation and an accurate procedure for calculating the coupling coefficient in distributed feedback lasers with laterally-coupled ridge-waveguide surface grating structures and in
distributed Bragg reflector lasers with etched-through-ridge-waveguide surface gratings are introduced. Based on the difference in optical confinement between the pumped and un-pumped regions in the transverse plane, the single transverse mode operation figures of merit are effective and easy to calculate, while the improved coupling coefficient calculation procedure gives experimentally confirmed better results than the conventional calculation approaches, particularly for surface gratings with variable refractive index in the grating areas.

General information
State: E-pub ahead of print
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: Semiconductor Technology and Applications
Authors: Uusitalo, T., Virtanen, H., Dumitrescu, M.
Number of pages: 11
Publication date: Jun 2017
Peer-reviewed: Yes

Publication information
Journal: Optical and Quantum Electronics
Volume: 49
Issue number: 6
Article number: 206
ISSN (Print): 0306-8919
Ratings:
Scopus rating (2016): CiteScore 1.02 SJR 0.321 SNIP 0.629
Scopus rating (2015): SJR 0.392 SNIP 0.668 CiteScore 1.05
Scopus rating (2014): SJR 0.373 SNIP 0.591 CiteScore 0.98
Scopus rating (2013): SJR 0.547 SNIP 0.861 CiteScore 1.29
Scopus rating (2012): SJR 0.473 SNIP 0.787 CiteScore 0.95
Scopus rating (2011): SJR 0.463 SNIP 0.617 CiteScore 0.77
Scopus rating (2010): SJR 0.439 SNIP 0.517
Scopus rating (2009): SJR 0.688 SNIP 0.645
Scopus rating (2008): SJR 0.562 SNIP 0.646
Scopus rating (2007): SJR 0.66 SNIP 0.654
Scopus rating (2006): SJR 0.558 SNIP 0.549
Scopus rating (2005): SJR 0.754 SNIP 0.695
Scopus rating (2004): SJR 0.87 SNIP 0.87
Scopus rating (2003): SJR 0.871 SNIP 0.717
Scopus rating (2002): SJR 0.679 SNIP 0.705
Scopus rating (2001): SJR 0.691 SNIP 0.608
Scopus rating (2000): SJR 0.682 SNIP 0.579
Scopus rating (1999): SJR 1.175 SNIP 0.759
Original language: English
DOIs:
10.1007/s11082-017-1039-y
Research output: Scientific - peer-review › Article

Pyrolysed cellulose nanofibrils and dandelion pappus in supercapacitor application
Dandelion pappus and wood based nanocellulose fibrils were combined to form films that were subsequently pyrolyzed under low-pressure conditions in a carbon monoxide (CO) rich atmosphere to make supercapacitor electrode material. The electrodes were prepared from these materials and pyrolyzed under low-pressure conditions in a carbon monoxide-rich atmosphere. The electrode materials and assembled supercapacitors were electrically and structurally characterized. The assembled six supercapacitors showed specific capacitances per electrode ranging from 1 to 6 F/g and surface resistance of pyrolyzed electrodes ranging from 30 to 170 Ω. Finally, equivalent series resistance and leakage current measurements were conducted for three samples, resulting values from 125 to 500 Ω and from 0.5 to 5.5 µA, respectively.

General information
State: E-pub ahead of print
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research area: Microsystems, Electronics and Communications Engineering, Materials Science, Research group: Plastics and Elastomer Technology, Research group: Plastics and Elastomer Technology, Research area: Measurement Technology and Process Control, Research group: Sensor Technology and Biomeasurements (STB), BioMediTech, BioMediTech Institute and Faculty of Biomedical Sciences and Engineering
Some bacterial strains such as Komagataeibacter xylinus are able to produce cellulose as an extracellular matrix. In comparison to wood-based cellulose, bacterial cellulose (BC) holds interesting properties such as biodegradability, high purity, water-holding capacity, and superior mechanical and structural properties. Aiming toward improvement in BC production titer and tailored alterations to the BC film, we engineered K. xylinus to overexpress partial and complete bacterial cellulose synthase operon that encodes activities for BC production. The changes in cell growth, end metabolite, and BC production titers from the engineered strains were compared with the wild-type K. xylinus. Although there were no significant differences between the growth of wild-type and engineered strains, the engineered K. xylinus strains demonstrated faster BC production, generating 2–4-fold higher production titer (the highest observed titer was obtained with K. xylinus-bcsABCD strain producing 4.3 ± 0.46 g/L BC in 4 days). The mechanical and structural characteristics of cellulose produced from the wild-type and engineered K. xylinus strains were analyzed with a stylus profilometer, in-house built tensile strength measurement system, a scanning electron microscope, and an X-ray diffractometer. Results from the profilometer indicated that the engineered K. xylinus strains produced thicker BC films (wild type, 5.1 μm, and engineered K. xylinus strains, 6.2–10.2 μm). Scanning electron microscope revealed no principal differences in the structure of the different type BC films. The crystallinity index of all films was high (from 88.6 to 97.5%). All BC films showed significant piezoelectric response (5.0–20 pC/N), indicating BC as a promising sensor material.
Simulation studies of DFB laser longitudinal structures for narrow linewidth emission

The paper presents simulation studies targeting high-power narrow-linewidth emission from semiconductor distributed feedback (DFB) lasers. The studies contain analytic and numerical calculations of emission linewidth, side mode suppression ratio and output power for DFB lasers without phase shifts and with $1 \times \lambda/4$ and $2 \times \lambda/8$ phase shifts, taking into account the grating and facets reflectivities, the randomness of the spontaneous emission and the longitudinal photon and carrier density distributions in the laser cavity. Single device structural parameter optimization is generally associated with a trade-off between achieving a narrow linewidth and a high output power. Correlated optimization of multiple structural parameters enables the evaluation of achievable ranges of narrow linewidth and high power combinations. Devices with long cavities and low grating coupling coefficients, $\kappa$ (keeping $\kappa L$ values below the levels that promote re-broadening), with AR-coated facets and with a distributed phase-shift have the flattest longitudinal photon and carrier density distributions. This flatness enables stable single-longitudinal-mode operation with high side-mode-suppression ratio up to high injection current densities, which facilitates narrow linewidths and high output powers. The results reported in the paper indicate that Master-Oscillator Power-Amplifier laser structures are needed for achieving W-level high-powers with sub-MHz linewidths because most single-cavity DFB laser structural variations that reduce the linewidth also limit the achievable output power in single-mode operation.
Structural Investigation of Uniform Ensembles of Self-Catalyzed GaAs Nanowires Fabricated by a Lithography-Free Technique

Structural analysis of self-catalyzed GaAs nanowires (NWs) grown on lithography-free oxide patterns is described with insight on their growth kinetics. Statistical analysis of templates and NWs in different phases of the growth reveals extremely high-dimensional uniformity due to a combination of uniform nucleation sites, lack of secondary nucleation of NWs, and self-regulated growth under the effect of nucleation antibunching. Consequently, we observed the first evidence of sub-Poissonian GaAs NW length distributions. The high phase purity of the NWs is demonstrated using complementary transmission electron microscopy (TEM) and high-resolution X-ray diffractometry (HR-XRD). It is also shown that, while NWs are to a large extent defect-free with up to 2-μm-long twin-free zincblende segments, low-temperature microphotoluminescence spectroscopy reveals that the proportion of structurally disordered sections can be detected from their spectral properties.

Structural Investigation of Uniform Ensembles of Self-Catalyzed GaAs Nanowires Fabricated by a Lithography-Free Technique

Structural analysis of self-catalyzed GaAs nanowires (NWs) grown on lithography-free oxide patterns is described with insight on their growth kinetics. Statistical analysis of templates and NWs in different phases of the growth reveals extremely high-dimensional uniformity due to a combination of uniform nucleation sites, lack of secondary nucleation of NWs, and self-regulated growth under the effect of nucleation antibunching. Consequently, we observed the first evidence of sub-Poissonian GaAs NW length distributions. The high phase purity of the NWs is demonstrated using complementary transmission electron microscopy (TEM) and high-resolution X-ray diffractometry (HR-XRD). It is also shown that, while NWs are to a large extent defect-free with up to 2-μm-long twin-free zincblende segments, low-temperature microphotoluminescence spectroscopy reveals that the proportion of structurally disordered sections can be detected from their spectral properties.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: Semiconductor Technology and Applications
Authors: Koivusalo, E., Hakkarainen, T., Guina, M.
Publication date: 16 Mar 2017
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 12
Issue number: 192
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Investigation of the structural anisotropy in a self-assembling glycinate layer on Cu(100) by scanning tunneling microscopy and density functional theory calculations

Self-assembling organic molecule-metal interfaces exhibiting free-electron like (FEL) states offers an attractive bottom-up approach to fabricating materials for molecular electronics. Accomplishing this, however, requires detailed understanding of the fundamental driving mechanisms behind the self-assembly process. For instance, it is still unresolved as to why the adsorption of glycine ([NH2(CH2)COOH]) on isotropic Cu(100) single crystal surface leads, via deprotonation and self-assembly, to a glycinate ([NH2(CH2)COO−]) layer that exhibits anisotropic FEL behavior. Here, we report on bias-dependent scanning tunneling microscopy (STM) experiments and density functional theory (DFT) calculations for glycine adsorption on Cu(100) single crystal surface. We find that after physical vapor deposition (PVD) of glycine on Cu(100), glycinate self-assembles into an overlayer exhibiting c(2x4) and p(2x4) symmetries with non-identical adsorption sites. Our findings underscore the intricacy of electrical conductivity in nanomolecular organic overlayers and the critical role the structural anisotropy at molecule-metal interface plays in the fabrication of materials for molecular electronics.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: Surface Science, Department of Physics and Astronomy, Russian Acad Sci, Ioffe Physical Technical Institute, Russian Academy of Sciences, Ioffe Phys Tech Inst
Authors: Kuzmin, M., Lahtonen, K., Vuori, L., Sánchez-de-Armas, R., Hirsimäki, M., Valden, M.
Number of pages: 6
Pages: 111-116
Publication date: 4 Mar 2017
Peer-reviewed: Yes

Publication information
Journal: Applied Surface Science
Volume: 409
ISSN (Print): 0169-4332
Ratings:
Scopus rating (2016): SJR 0.951 SNIP 1.225 CiteScore 3.37
Scopus rating (2015): SJR 0.914 SNIP 1.3 CiteScore 3.13
Scopus rating (2014): SJR 0.958 SNIP 1.477 CiteScore 2.96
Scopus rating (2013): SJR 0.965 SNIP 1.488 CiteScore 2.78
Scopus rating (2012): SJR 0.918 SNIP 1.373 CiteScore 2.26
Scopus rating (2011): SJR 0.908 SNIP 1.402 CiteScore 2.27
Scopus rating (2010): SJR 0.924 SNIP 1.141
Scopus rating (2009): SJR 0.842 SNIP 1.023
Scopus rating (2008): SJR 0.899 SNIP 1.087
Scopus rating (2007): SJR 0.795 SNIP 0.945
Scopus rating (2006): SJR 0.852 SNIP 1.052
Scopus rating (2005): SJR 0.679 SNIP 0.946
Scopus rating (2004): SJR 0.964 SNIP 1.126
Scopus rating (2003): SJR 0.988 SNIP 1.027
Scopus rating (2002): SJR 0.921 SNIP 0.954
Scopus rating (2001): SJR 0.841 SNIP 0.796
Scopus rating (2000): SJR 0.866 SNIP 0.772
Scopus rating (1999): SJR 1.064 SNIP 0.907
Original language: English
Keywords: Cu(100), STM, Glycine, Glycinate, DFT, Self-assembly, Nanoscience
Multi-wavelength mid-IR light source for gas sensing

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Publication date: 20 Feb 2017

Host publication information
Title of host publication: Proc. SPIE 10110 : Photonic Instrumentation Engineering IV
Volume: 10110
Publisher: SPIE
Article number: 101100P
ISBN (Print): 9781510606616
ISBN (Electronic): 9781510606623

Publication series
Name: Proceedings of SPIE
Volume: 10110
ISSN (Print): 0277-786X
ISSN (Electronic): 1996-756X
DOIs: 10.1117/12.2249126

Research output: Scientific - peer-review › Conference contribution

Analysis of the photon–photon resonance influence on the direct modulation bandwidth of dual-longitudinal-mode distributed feedback lasers
The paper explores the possibilities to extend the direct modulation bandwidth in dual-longitudinal-mode distributed feedback lasers by exploiting the photon–photon resonance induced by the interaction of the two modes in the laser cavity. The effects on the direct amplitude modulation and on the direct modulation of the difference frequency between the two modes are analyzed using simulation and experimental results. When the photon–photon resonance, which occurs at the difference frequency between the two modes, is properly placed at a higher frequency than the carrier-photon resonance, the small-signal amplitude modulation (AM) bandwidth of the laser can be significantly increased. However, both simulations and experiments point out that a high small-signal AM bandwidth does not lead to a high large-signal AM bandwidth if the small-signal modulation response has significant variations across the modulation bandwidth. The paper shows that a high large-signal AM bandwidth is obtained when the two modes are significantly unbalanced, whereas a high-bandwidth difference frequency modulation can be best detected when the two modes are balanced and the DC bias is properly chosen.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Photonics, Research group: Semiconductor Technology and Applications, Department of Electronics and Telecommunications Politecnico di Torino
Authors: Uusitalo, T., Virtanen, H., Bardella, P., Dumitrescu, M.
Number of pages: 14
Publication date: 5 Jan 2017
Peer-reviewed: Yes

Publication information
Journal: Optical and Quantum Electronics
31% European InGaP/GaAs/InGaNAs Solar Cells For Space Application

We report a triple junction InGaP/GaAs/InGaNAs solar cell with efficiency of ~31% at AM0, 25 °C fabricated using a combined molecular beam epitaxy (MBE) and metal-organic chemical vapour deposition (MOCVD) processes. The prototype cells comprise of InGaNAs (Indium Gallium Nitride Arsenide) bottom junction grown on a GaAs (Gallium Arsenide) substrate by MBE and middle and top junctions deposited by MOCVD. Repeatable cell characteristics and uniform efficiency pattern over 4-inch wafers were obtained. Combining the advantages offered by MBE and MOCVD opens a new perspective for fabrication of high-efficiency space tandem solar cells with three or more junctions. Results of radiation resistance of the sub-cells are also presented and critically evaluated to achieve high efficiency in EOL conditions.
Aerosol analysis of residual and nanoparticle fractions from spray pyrolysis of poorly volatile precursors

The quality of aerosol-produced nanopowders can be impaired by micron-sized particles formed due to non-uniform process conditions. Methods to evaluate the quality reliably and fast, preferably on-line, are important at industrial scales. Here, aerosol analysis methods are used to determine the fractions of nanoparticles and micron-sized residuals from poorly volatile precursors. This is accomplished using aerosol instruments to measure the number and mass size distributions of Liquid Flame Spray-generated alumina and silver particles produced from metal nitrates dissolved in ethanol and 2-ethylhexanoic acid (EHA). The addition of EHA had no effect on silver, whereas, 5% EHA concentration was enough to shift the alumina mass from the residuals to nanoparticles. The size-resolved aerosol analysis proved to be an effective method for determining the product quality. Moreover, the used on-line techniques alone can be used to evaluate the process output when producing nanopowders, reducing the need for tedious off-line analyses. © 2016 American Institute of Chemical Engineers AIChE J, 2016
Composition and Bandgap determination of MBE-grown GaInNAsSb

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Department of Materials Science
Authors: Aho, A., Korpijärvi, V., Isoaho, R., Malinen, P., Tukiainen, A., Honkanen, M. H., Guina, M.
Publication date: 2017

Host publication information
Title of host publication: 19th International Conference on Molecular-Beam Epitaxy
Bibliographical note
Research output: Professional › Conference contribution

Effect of Nozzle Geometry on the Microstructure and Properties of HVAF Sprayed Hard Metal Coatings
Thermally sprayed hard metal coatings are the industrial standard solution for numerous demanding applications. Often the performance of thermally sprayed coatings is improved by using finer particle sizes due to improved surface finish and decreased defect sizes. In the aim of utilizing finer particle and primary carbide sizes in thermal spraying of hard metal coatings, several approaches have been studied to control the spray temperature. The most viable solution is to use the modern high velocity air-fuel (HVAF) spray process, which has already proven to produce high quality coatings with dense structures. In HVAF spray process, the particle heating and acceleration can be efficiently controlled by changing the nozzle geometry. In this study, fine WC-10Co4Cr powder (-25+5 µm) was sprayed with three nozzle geometries to investigate their effect on the particle temperature, velocity and coating microstructure. The study demonstrates that the particle melting and resulting W2C formation can be efficiently controlled by changing the nozzle geometry from cylindrical to convergent-divergent. Moreover, the average particle velocity was increased from 780 to over 900 m/s. This increase in particle velocity significantly improved the coating structure and density while deposition efficiency decreased slightly. Further evaluation was carried out to resolve the effect of particle in-flight parameters on coating structure and cavitation erosion resistance, which was significantly improved with the increasing average particle velocity.

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Materials Science
Authors: Matikainen, V., Koivuluoto, H., Schubert, J., Houdkova, S., Vuoristo, P.
Number of pages: 6
Publication date: 2017

Host publication information
Title of host publication: Thermal Spray 2017: Proceedings from the International Thermal Spray Conference (June 7-9)
Publisher: DVS Media GmbH
ISBN (Print): 978-3-96144-000-9
Research output: Scientific › Conference contribution

Improved corrosion properties of Hot Dip Galvanized Steel by nanomolecular silane layers as hybrid interface between zinc and top coatings
Thin organic coatings (TOC) or paints on hot dip galvanized steel (HDGS) improve the corrosion properties and create visually pleasing surfaces. Delamination of these coatings lead to corrosion and peeling of the paints. Hence, a novel method for improved adhesion and corrosion properties for HDGS surfaces is introduced. It is shown how the fabrication of a nanomolecular silane film as an interfacial layer between the HDGS and TOC or paint improves the corrosion properties of HDGS in different pH regimes. Understanding the corrosion behavior of ultra-thin silane layers under differing pH is crucial as subsequent coatings have different pHs. By varying the silanization parameters two different nanomolecular surface structures of aminopropyl trimethoxysilane (APS) on HDGS were fabricated: well-ordered monolayers with approximately 1 nm thickness and highly clustered APS films with a thickness in the range of 5-8 nm. To verify the nanomolecular APS structures, photoelectron spectroscopy (PES) and contact angle (CA) measurements were employed. The corrosion properties of HDGS and silanized HDGS were studied with linear sweep voltammetry (LSV) and
electrochemical impedance spectroscopy (EIS). It is shown that at pH 5 and 7 passivation behavior is observed on silanized samples but the most significant improvement in corrosion resistance is found at pH 10 where the corrosion currents of silanized samples are up to two orders of magnitude lower than on uncoated metallic samples. Also, it is demonstrated that the corrosion inhibition of APS is not only dependent on the thickness of the silane film, but also the molecular ordering at the surface. The thin, well-ordered APS monolayer is more resistant towards corrosion in NaCl solution (pH 7) than thicker clustered APS layer. This indicates that the highly ordered nanomolecular surface structure protects the HDGS-silane interface from the Cl- adsorption better than the thicker, but more randomly ordered APS layers. Nanomolecular interfacial silane films for enhanced corrosion and adhesion properties on HDGS are transferrable to industrial production lines providing a low cost and environmentally friendly method for improved HDGS products.

Magnified time-domain ghost imaging
Ghost imaging allows the imaging of an object without directly seeing this object. Originally demonstrated in the spatial domain, it was recently shown that ghost imaging can be transposed into the time domain to detect ultrafast signals, even in the presence of distortion. We propose and experimentally demonstrate a temporal ghost imaging scheme which generates a $T\times$ magnified ghost image of an ultrafast waveform. Inspired by shadow imaging in the spatial domain and building on the dispersive Fourier transform of an incoherent supercontinuum in an optical fiber, the approach overcomes the resolution limit of standard time-domain ghost imaging generally imposed by the detectors speed. The method can be scaled up to higher magnification factors using longer fiber lengths and light source with shorter duration.
Nonlinear microscopy using cylindrical vector beams: Applications to three-dimensional imaging of nanostructures

The three-dimensional (3D) optical fields that arise from the focusing of cylindrical vector beams (CVB) with radial and azimuthal polarizations provide new sources of contrast for optical microscopy of nano-objects. So far, these demonstrations have been restricted to two-dimensional transversal scanning, i.e., along the focal plane of interest, or use of point-like objects, i.e., single molecules and nanoparticles. Here, we demonstrate the first application of CVBs for 3D imaging of 3D nano-objects. This technique is done by acquiring 3D image scans of the second-harmonic generation signal from vertically-aligned semiconductor nanowires, whose second-order response is primarily driven by the longitudinal electric field, i.e., the field component along the nanowire axis. Our technique provides a new way to study individual nano-objects in three dimensions through the unique combination of nonlinear microscopy and CVBs.
Picosecond MOPA with ytterbium doped tapered double clad fiber
The powerful picosecond master oscillator - power amplifier (MOPA) with double clad ytterbium doped tapered fiber as a buster amplifier has been demonstrated in the presented paper. The developed MOPA has 60ps pulses with 0.3mJ pulse energy and 5MW peak power.

Tailored Fabrication of Transferable and Hollow Weblike Titanium Dioxide Structures
The preparation of weblike titanium dioxide thin films by atomic layer deposition on cellulose biotemplates is reported. The method produces a TiO2 web, which is flexible and transferable from the deposition substrate to that of the end application. Removal of the cellulose template by calcination converts the amorphous titania to crystalline anatase and gives the structure a hollow morphology. The TiO2 webs are thoroughly characterized using electron microscopy, X-ray diffraction, and X-ray photoelectron spectroscopy to give new insight into manufacturing of porous titanium dioxide structures by means of template-based methods. Functionality and integrity of the TiO2 hollow weble thin films were successfully confirmed by applying them as electrodes in dye-sensitized solar cells.
Thermal Modification of ALD Grown Titanium Oxide Ultra Thin Film for Photoanode Applications

State: Published
Organisations: Optoelectronics Research Centre, Research group: Surface Science
Authors: Hannula, M. K., Lahtonen, K. T., Isotalo, T. J., Saari, J. S., Valden, M. O.
Publication date: 15 Dec 2016
Peer-reviewed: Unknown
Event: Paper presented at Symposium on Future Prospects for Photonics, Tampere, Finland.
ASJC Scopus subject areas: Renewable Energy, Sustainability and the Environment, Surfaces, Coatings and Films, Surfaces and Interfaces, Atomic and Molecular Physics, and Optics
Keywords: Titanium dioxide, titanium silicide, Atomic layer deposition (ALD), photoemission electron microscopy, PEEM, hydrogen energy
Research output: Scientific - paper, poster or abstract

High power (60 mW) GaSb-based 1.9 μm superluminescent diode with cavity suppression element
The characteristics and the fabrication of a 1.9 μm superluminescent diode utilizing a cavity suppression element are reported. The strong suppression of reflections allows the device to reach high gain without any sign of lasing modes. The high gain enables strong amplified spontaneous emission and output power up to 60 mW in a single transverse mode. At high gain, the spectrum is centered around 1.9 μm and the full width at half maximum is as large as 60 nm. The power and spectral characteristics pave the way for demonstrating compact and efficient light sources for spectroscopy. In particular, the light source meets requirements for coupling to silicon waveguides and fills a need for leveraging to mid-IR
applications photonics integration circuit concepts exploiting hybrid integration to silicon technology.

### General information

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Research group: Nanophotonics, Facilities and Infrastructure
Authors: Zia, N., Viheriälä, J., Koskinen, R., Aho, A., Suomalainen, S., Guina, M.
Number of pages: 3
Publication date: 6 Dec 2016
Peer-reviewed: Yes

### Publication information

Volume: 109
Issue number: 23
Article number: 231102
ISSN (Print): 0003-6951
Ratings:
Scopus rating (2016): CiteScore 2.67 SJR 1.132 SNIP 0.996
Scopus rating (2015): SJR 1.085 SNIP 0.983 CiteScore 2.47
Scopus rating (2014): SJR 1.799 SNIP 1.462 CiteScore 3.25
Scopus rating (2013): SJR 2.149 SNIP 1.652 CiteScore 3.77
Scopus rating (2012): SJR 2.554 SNIP 1.754 CiteScore 3.76
Scopus rating (2011): SJR 2.805 SNIP 1.94 CiteScore 4.04
Scopus rating (2010): SJR 2.926 SNIP 1.789
Scopus rating (2009): SJR 2.857 SNIP 1.848
Scopus rating (2008): SJR 2.934 SNIP 1.83
Scopus rating (2007): SJR 3.039 SNIP 1.913
Scopus rating (2006): SJR 3.457 SNIP 2.288
Scopus rating (2005): SJR 3.709 SNIP 2.382
Scopus rating (2004): SJR 3.904 SNIP 2.38
Scopus rating (2003): SJR 3.765 SNIP 2.27
Scopus rating (2002): SJR 3.917 SNIP 2.365
Scopus rating (2001): SJR 4.111 SNIP 2.212
Scopus rating (2000): SJR 4.277 SNIP 2.013
Scopus rating (1999): SJR 4.35 SNIP 2.11
Original language: English
Keywords: OPTOELECTRONICS, Mid-IR light sources, Photonics

Electronic versions:
High power (60 mW) GaSb-based 1.9 μm superluminescent diode with cavity suppression element
DOIs:
10.1063/1.4971972
Links:
http://urn.fi/URN:NBN:fi:tty-201612234914
Research output: Scientific - peer-review › Article

### Ambient-Pressure XPS of Electrochemical Interfaces for Solar Fuel Production

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Surface Science
Authors: Ali-Löytty, H. J.
Publication date: 1 Dec 2016
Peer-reviewed: Unknown
Links:
Research output: Scientific › Paper, poster or abstract
Improving the current output of GaInNAs solar cells using distributed Bragg reflectors

The influence of AlGaAs-based distributed Bragg reflector (DBR) on the performance of a GaInNAs n-i-p solar cells is reported. The DBR increased the short circuit current density by ~1 mA/cm², owing to increased external quantum efficiency in the wavelength range from 1120 nm to 1240 nm. As a result of the incorporation of the DBR structure, the series resistance of the cell was increased by 4 mOhm-cm².

Spectral characteristics of narrow-linewidth high-power 1180 nm DBR laser with surface gratings

We report narrow-linewidth 1180 nm GaInNAs/ GaAs distributed Bragg reflector lasers reaching up to 500 mW continuous-wave output power at room temperature. The lasers employ surface gratings, which avoided the problematic regrowth and enabled a high side-mode suppression ratio over a relatively large mode-hop-free tuning range. Wavelength tuning rates of 0.1 nm/C and 1 pm/mA were obtained by changing the mount temperature and the drive current, respectively. The lasers exhibit a narrow emission linewidth (<250 kHz) even at high output power levels. The side-mode suppression ratio is relatively independent of the power level and remains higher than 50 dB even in the vicinity of the roll-off point. An outstanding temperature stability is provided by good carrier confinement in the GaInNAs/GaAs quantum well. A 2000 hour burn-in with constant 1.5 A bias at 20 C improved the output characteristics slightly and did not reveal any failure among the tested components.
VECSEL systems for the generation and manipulation of trapped magnesium ions

Experiments in atomic, molecular, and optical (AMO) physics rely on lasers at many different wavelengths and with varying requirements on the spectral linewidth, power, and intensity stability. Vertical external-cavity surface-emitting lasers (VECSELs), when combined with nonlinear frequency conversion, can potentially replace many of the laser systems currently in use. Here, we present and characterize VECSEL systems that can perform all laser-based tasks for quantum information processing experiments with trapped magnesium ions. For the photoionization of neutral magnesium, 570.6 nm light is generated with an intracavity frequency-doubled VECSEL containing a lithium triborate crystal. External frequency doubling produces 285.3 nm light for a resonant interaction with the 1S0↔1P1 transition of neutral Mg. Using an externally frequency-quadrupled VECSEL, we implement Doppler cooling of Mg25+ on the 279.6 nm 2S1/2↔2P3/2 cycling transition, repumping on the 280.4 nm 2S1/2↔2P1/2 transition, coherent state manipulation, and resolved sideband cooling close to the motional ground state. Our systems serve as prototypes for applications in AMO requiring single-frequency, power-scalable laser sources at multiple wavelengths.
Novel self-catalyzed GaAs nanowires with electrical contacts

Electrical contacting and transport measurements of single self-catalyzed GaAs nanowires grown by molecular beam epitaxy is presented. The nanowires are grown directly in silicon using a recently developed technique based on lithography-free Si/SiOx patterns fabricated by a self-assembled method, which allows synthesis of highly uniform nanowires with controllable size and density.

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Piton, M. R., Koivusalo, E., Suomalainen, S., Hakkarainen, T., Guina, M.
Number of pages: 3
Pages: 1-3
Publication date: 3 Nov 2016
Host publication information
Title of host publication: 2016 31st Symposium on Microelectronics Technology and Devices (SBMicro)
Publisher: IEEE
ISBN (Electronic): 978-1-5090-2788-0
Keywords: III-V semiconductors, electrical contacts, electron beam lithography, elemental semiconductors, gallium arsenide, molecular beam epitaxial growth, nanowires, silicon, wide band gap semiconductors, lithography-free silicon-silicon oxide patterns, molecular beam epitaxy, self-assembled method, self-catalyzed gallium arsenide nanowires, transport measurements, Contacts, Gallium arsenide, Nanowires, Scanning electron microscopy, Silicon, Substrates, Surface morphology, III-V nanowires, semiconductor nanostructures, transport properties
DOI:
10.1109/SBMicro.2016.7731335
Bibliographical note
INT=orc,“Rizzo Piton, Marcelo”
Source: Bibtex
Source-ID: urn:a7a526a49420145ca86e1c88028bb3cf
Research output: Scientific - peer-review › Conference contribution

Local variation in Bi crystal sites of epitaxial GaAsBi studied by photoelectron spectroscopy and first-principles calculations

Abstract Epitaxial Bi-containing III–V crystals (III-V1-xBix) have attracted increasing interest due to their potential in infrared applications. Atomic-scale characterization and engineering of bulk-like III-V1-xBix properties (e.g., Bi incorporation and defect formation) are challenging but relevant to develop applications. Toward that target, we report here that the traditional surface-science measurement of photoelectron spectroscopy (PES) is a potential, non-destructive method to be combined in the studies of bulk-like properties, when surface effects are properly removed. We have investigated epitaxial GaAs1-xBix films, capped by epitaxial AlAs layers, with high-resolution photoelectron spectroscopy. The Bi5d core-level spectra of GaAs1-xBix together with ab-initio calculations give direct evidence of variation of Bi bonding environment in the lattice sites. The result agrees with photoluminescence (PL) measurement which shows that the studied GaAs1-xBix films include local areas with higher Bi content, which contribute to PL but do not readily appear in x-ray diffraction (XRD). The measured and calculated Bi core-level shifts show also that Ga vacancies and Bi clusters are dominant defects.

General information
State: E-pub ahead of print
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, University of Turku
Number of pages: 7
Pages: 688-694
Publication date: 2 Nov 2016
Peer-reviewed: Yes
Publication information
Journal: Applied Surface Science
Volume: 396
Elastic-Plastic Transition in MBE-Grown GaSb Semiconducting Crystal Examined by Nanoindentation

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Univ Helsinki, University of Helsinki, Dept Phys, Aalto University, Department of Materials Science and Engineering, Institute of Materials Science, University of Silesia, 75 Pulku Piechoty 1, 45-500 Chorzów, Poland, Institute of Physics, University of Silesia, 75 Pułku Piechoty 1, 45-500 Chorzów, Poland
Authors: Majtyka, A., Trębala, M., Tukiainen, A., Chrobak, D., Borgiel, W., Räisänen, J., Nowak, R.
Number of pages: 3
Pages: 1131-1133
Publication date: 1 Oct 2016
Peer-reviewed: Yes

Publication information
Journal: Acta Physica Polonica A
Volume: 130
Issue number: 4
ISSN (Print): 0587-4246
Ratings:
Scopus rating (2016): SJR 0.235 SNIP 0.411 CiteScore 0.51
Scopus rating (2015): SJR 0.267 SNIP 0.493 CiteScore 0.56
Scopus rating (2014): SJR 0.276 SNIP 0.614 CiteScore 0.6
Scopus rating (2013): SJR 0.345 SNIP 0.556 CiteScore 0.63
Scopus rating (2012): SJR 0.287 SNIP 0.575 CiteScore 0.54
Scopus rating (2011): SJR 0.254 SNIP 0.471 CiteScore 0.43
Scopus rating (2010): SJR 0.289 SNIP 0.409

Original language: English
Keywords: GaAsBi, Photoelectron spectroscopy, Synchrotron radiation, Photoluminescence
DOIs:
10.1016/j.apsusc.2016.11.009

Bibliographical note
EXT="Laukkanen, Pekka Johannes"
Source: RIS
Source-ID: urn:F0AB66EA273F395969EA2534147E4923
Research output: Scientific - peer-review › Article
Compact microdisk cavity laser with GaInNAs/GaAs quantum well

Optically pumped 3-6μm in diameters microdisk lasers with InGaAsN/GaAs quantum well active region has been studied. Single-mode CW lasing at 78K temperature in microdisk laser with 3 μm diameter is demonstrated.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Nanophotonics, Research group: Semiconductor Technology and Applications, Peter the Great St. Petersburg Polytechnic University, Ioffe Physico-Technical Institute, Russian Academy of Sciences
Number of pages: 5
Publication date: 15 Sep 2016
Peer-reviewed: Yes

Publication information
Journal: Journal of Physics: Conference Series
Volume: 741
Issue number: 1
Article number: 012110
ISSN (Print): 1742-6588
Ratings:
Scopus rating (2016): SJR 0.24 SNIP 0.383 CiteScore 0.45
Scopus rating (2015): SJR 0.24 SNIP 0.373 CiteScore 0.35
Scopus rating (2014): SJR 0.253 SNIP 0.344 CiteScore 0.32
Scopus rating (2013): SJR 0.231 SNIP 0.272 CiteScore 0.25
Scopus rating (2012): SJR 0.28 SNIP 0.354 CiteScore 0.33
Scopus rating (2011): SJR 0.292 SNIP 0.352 CiteScore 0.43
Scopus rating (2010): SJR 0.288 SNIP 0.344
Scopus rating (2009): SJR 0.253 SNIP 0.321
Scopus rating (2008): SJR 0.265 SNIP 0.294
Scopus rating (2007): SJR 0.257 SNIP 0.39
Scopus rating (2006): SJR 0.267 SNIP 0.284
Original language: English
ASJC Scopus subject areas: Physics and Astronomy(all)
DOIs:
10.1088/1742-6596/741/1/012110
Links:
http://www.scopus.com/inward/record.url?scp=84989284874&partnerID=8YFLogxK (Link to publication in Scopus)
Correlating structure and optical properties of self-catalyzed GaAs nanowires grown on lithography-free Si/SiOx patterns

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Koivusalo, E. S., Hakkarainen, T. V., Guina, M.
Publication date: 6 Sep 2016
Peer-reviewed: Unknown
Keywords: GaAs nanowires, Self-catalyzed, X-ray diffraction, Photoluminescence
Research output: Scientific › Paper, poster or abstract

3D micro-nano structured hybrid scaffolds: An investigation into the role of nanofiber coating on viability, proliferation and differentiation of seeded mesenchymal stem cells

The introduction of a three dimensional scaffold providing the closest analogies to extracellular matrix (ECM) is currently a key strategy for tackling many challenges in tissue repair. Here, we present a new hybrid scaffold constructed by coating electrospun chitosan/polyethylene oxide (PEO) nanofibers on commercial BioTek polystyrene (PS) scaffold obtained from Sigma Aldrich. The viability and proliferation rate of mesenchymal stem cells (MSCs) seeded on micro-nano structured hybrid scaffold (MNHS) and commercial PS scaffolds were analyzed by MTT assay. The results of the MTT assay revealed a higher degree of viability and proliferation rate in MSCs seeded on MNHS compared with the commercial PS scaffold. DAPI images also confirmed the higher degree of attachment and viability of MSCs seeded on MNHS. Moreover, MSCs on both scaffolds differentiated to osteoblasts and adipocytes cells, as reflected by the images obtained from Alizarin Red and Oil Red-O staining. Alkaline phosphatase activity (ALP) and calcium content assays revealed that the MNHS has a higher potential for osteogenic differentiation than the commercial scaffold. To quantify the osteoblast and adipocyte gene expression, quantitative RT-PCR was carried out for MNHS, commercial scaffold and Tissue culture polystyrene (TCP). It was found that MNHS can express a higher level of Runt-related transcription factor 2 (Runx2), osteonectin and osteocalcin in osteogenic differentiation as well as increased expression of PPARγ and UCP-1 in adipogenic differentiation. The enhancement of the attachment, viability and proliferation as well as bi-lineage differentiation may result from the biochemical and structural analogies of MNHS to native ECM. Furthermore, it was observed that biocompatible MNHS scaffold can potentially be utilized as a suitable scaffold for bone and connective tissue engineering.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Fibre Materials, Tarbiat Modares University, Isfahan University of Medical Sciences, VTT Technical Research Centre of Finland
Authors: Pilehrood, M. K., Atashi, A., Sadeghi-Aliabadi, H., Nousiainen, P., Harlin, A.
Number of pages: 8
Pages: 9000-9007
Publication date: 1 Sep 2016
Peer-reviewed: Yes

Publication Information
Journal: Journal Nanoscience and Nanotechnology
Volume: 16
Issue number: 9
ISSN (Print): 1533-4880
Ratings:
Scopus rating (2016): SJR 0.321 SNIP 0.49 CiteScore 1.34
Scopus rating (2015): SJR 0.338 SNIP 0.488 CiteScore 1.23
Scopus rating (2014): SJR 0.328 SNIP 0.523 CiteScore 1.36
Scopus rating (2013): SJR 0.339 SNIP 0.546 CiteScore 1.26
Scopus rating (2012): SJR 0.422 SNIP 0.501 CiteScore 1.21
Scopus rating (2011): SJR 0.553 SNIP 0.697 CiteScore 1.47
Scopus rating (2010): SJR 0.571 SNIP 0.524
Scopus rating (2009): SJR 0.675 SNIP 0.589
A passively mode-locked Ho:YAG ceramic laser around 2.1 µm is demonstrated using GaSb-based near-surface SESAM as saturable absorber. Stable and self-starting mode-locked operation is realized in the entire tuning range from 2059 to 2121 nm. The oscillator operated at 82 MHz with a maximum output power of 230 mW at 2121 nm. The shortest pulses with duration of 2.1 ps were achieved at 2064 nm. We also present spectroscopic properties of Ho:YAG ceramics at room temperature.
Improved antifouling properties and selective biofunctionalization of stainless steel by employing heterobifunctional silane-polyethylene glycol overlayers and avidin-biotin technology

A straightforward solution-based method to modify the biofunctionality of stainless steel (SS) using heterobifunctional silane-polyethylene glycol (silane-PEG) overlayers is reported. Reduced nonspecific biofouling of both proteins and bacteria onto SS and further selective biofunctionalization of the modified surface were achieved. According to photoelectron spectroscopy analyses, the silane-PEGs formed less than 10 Å thick overlayers with close to 90% surface coverage and reproducible chemical compositions. Consequently, the surfaces also became more hydrophilic, and the observed non-specific biofouling of proteins was reduced by approximately 70%. In addition, the attachment of E. coli was reduced by more than 65%. Moreover, the potential of the overlayer to be further modified was demonstrated by successfully coupling biotinylated alkaline phosphatase (bAP) to a silane-PEG-biotin overlayer via avidin-biotin bridges. The activity of the immobilized enzyme was shown to be well preserved without compromising the achieved antifouling properties. Overall, the simple solution-based approach enables the tailoring of SS to enhance its activity for biomedical and biotechnological applications.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Surface Science, BioMediTech, University of Jyväskylä, Department of Physics, NanoScience Center
Publication date: 6 Jul 2016
Peer-reviewed: Yes

Publication information
Journal: Scientific Reports
Volume: 6
Article number: 29324
ISSN (Print): 2045-2322
Ratings:
Scopus rating (2016): CiteScore 4.63 SJR 1.625 SNIP 1.401
Scopus rating (2015): SJR 2.057 SNIP 1.684 CiteScore 5.3
Scopus rating (2014): SJR 2.103 SNIP 1.544 CiteScore 4.75
Scopus rating (2013): SJR 1.886 SNIP 1.51 CiteScore 4.06
Scopus rating (2012): SJR 1.458 SNIP 0.896 CiteScore 2.44
Original language: English
Electronic versions:
hynninen et al - Improved antifouling properties and selective biofunctionalization
DOI:
10.1038/srep29324
Links:
Research output: Scientific - peer-review Article

Fabrication of topographically microstructured titanium silicide interface for advanced photonic applications

We present a widely scalable, high temperature post-growth annealing method for converting ultra-thin films of TiO2 grown by atomic layer deposition to topographically microstructured titanium silicide (TiSi). The photoemission electron microscopy results reveal that the transformation from TiO2 to TiSi at 950 °C proceeds via island formation. Inside the islands, TiO2 reduction and Si diffusion play important roles in the formation of the highly topographically microstructured TiSi interface with laterally nonuniform barrier height contact. This is advantageous for efficient charge transfer in Si-based heterostructures for photovoltaic and photoelectrochemical applications.

General information
State: Published
Electronically tunable thulium-holmium modelocked fiber laser for the 1700-1800 nm wavelength band

We demonstrate a widely tunable, mode-locked fiber laser capable of producing sub-picosecond pulses between 1705 and 1805 nm. The 100 nm tuning range is achieved by using intracavity acousto-optic tunable filter. The laser delivers highly stable pulses via self-starting hybrid mode-locking triggered by frequency-shifting and nonlinear polarization evolution.
High-efficiency GaInP/GaAs/GaInNAs solar cells grown by combined MBE-MOCVD technique

Triple-junction GaInP/GaAs/GaInNAs solar cells with conversion efficiency of ~29% at AM0 are demonstrated using a combination of molecular beam epitaxy (MBE) and metal-organic chemical vapor deposition (MOCVD) processes. The bottom junction made of GaInNAs was first grown on a GaAs substrate by MBE and then transferred to an MOCVD system for subsequent overgrowth of the two top junctions. The process produced repeatable cell characteristics and uniform efficiency pattern over 4-inch wafers. Combining the advantages offered by MBE and MOCVD opens a new perspective for fabrication of high-efficiency tandem solar cells with three or more junctions.

General information

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, CESI S.p.A.
Authors: Tukiainen, A., Aho, A., Gori, G., Polojärvi, V., Casale, M., Greco, E., Isoaho, R., Aho, T., Raappana, M., Campesato, R., Guina, M.
Number of pages: 6
Pages: 914-919
Publication date: 17 Jun 2016
Peer-reviewed: Yes

Publication information

Journal: Progress in Photovoltaics: Research and Applications
Volume: 24
Issue number: 7
Article number: PIP2784
ISSN (Print): 1062-7995
Ratings:
Scopus rating (2016): SJR 2.224 SNIP 2.694 CiteScore 6.54
Scopus rating (2015): SJR 2.78 SNIP 3.33 CiteScore 7.31
Scopus rating (2014): SJR 3.279 SNIP 3.874 CiteScore 7.7
Scopus rating (2013): SJR 3.974 SNIP 5.653 CiteScore 8.93
Single-frequency 571nm VECSEL for photo-ionization of magnesium

We report the development of an intracavity-frequency-doubled vertical external-cavity surface-emitting laser (VECSEL) emitting at 571 nm for photoionization of magnesium. The laser employs a V-cavity geometry with a gain chip at the end of one cavity arm and a lithium triborate (LBO) crystal for second harmonic generation. The gain chip has a bottom-emitting design with ten GaInAs quantum wells of 7 nm thickness, which are strain compensated by GaAsP. The system is capable of producing up to 2.4 ± 0.1 W (total power in two separate output beams) in the visible. The free-running relative intensity noise was measured to be below −55 dBc/Hz over all frequencies from 1 Hz to 1 MHz. With acoustic isolation and temperature regulation of the laser breadboard, the mode-hop free operation time is typically over 5 hrs. To improve the long-term frequency stability, the laser can be locked to a Doppler-free transition of molecular iodine. To estimate the short-term linewidth, the laser was tuned to the resonance of a reference cavity. From analysis of the on-resonance Hänsch-Couillaud error signal we infer a linewidth of 50 ± 10 kHz. Light at 285 nm is generated with an external build-up cavity containing a β-barium borate (BBO) crystal. The UV light is used for loading 25Mg+ ions in a surface-electrode RF Paul trap. These results demonstrate the applicability and versatility of high-power, single-frequency VECSELS with intracavity harmonic generation for applications in atomic and molecular physics.

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, National Institute of Standards and Technology, Time and Frequency Division, Boulder, Colorado
Number of pages: 8
Publication date: 2 Jun 2016

Host publication information
Title of host publication: Proceedings of SPIE : Vertical External Cavity Surface Emitting Lasers (VECSELS) VI
Volume: 9734
Place of publication: San Francisco
Publisher: SPIE
Article number: 973411
ISBN (Electronic): 9781628419696

Publication series
Name: SPIE Conference Proceedings
ISSN (Print): 0277-786X
ISSN (Electronic): 1996-756X
Keywords: VECSEL, OPSL, SDL, frequency doubling, SHG, ion trapping, single-frequency, photoionization, doppler-free spectroscopy, magnesium
In-band-pumped mode-locked Ho:YAG ceramic laser at 2.1 μm

SESAM mode-locking of a Ho:YAG ceramic laser operating near 2.1 μm is reported achieving a pulse duration of 8 ps and output power as high as 258 mW at a repetition rate of ~83 MHz.

High-Power Tapered Distributed Bragg Reflector Laser Diodes Emitting at 1550 nm

Compact LiDAR systems work in the near infrared (NIR) area, more specifically at wavelengths around 800 nm to 900 nm. In adverse weather the measurement range decreases dramatically as the light is attenuated by rain drops or fog. The penetration length can be improved by increasing the optical peak power of the lasers, but in the NIR spectral range the maximum emission power permitted due to eye safety is very limited and almost reached by the current systems. A significantly higher optical power can be used in the short wave infrared (SWIR) range. LiDAR systems working, for example, at 1550 nm are employed in military applications. However, these LiDAR systems are very bulky. This paper presents a compact high-power single-mode 1.55 μm laser diode for LiDAR applications.

The AlGaInAs/InP distributed Bragg reflector (DBR) lasers comprise a passive DBR section, an active ridge waveguide (RWG) section and tapered gain-guided sections of different lengths and have been fabricated without regrowth. Measurements indicate that the output power scales with the length of the tapered section and hint that one of the limiting factors for power scaling with the tapered section length is the non-uniform heating of the chip. According to thermal simulations, the non-uniform heating seems to cause devices with a long tapered section to roll-over at a much lower average power density than devices with a shorter tapered section.

Typical devices emit up to 560 mW in single-mode continuous wave operation at room temperature with a high spectral purity (38 dB side-mode suppression ratio, SMSR, at maximum power). By changing the length of the tapered section from 0.5 mm to 4.0 mm the maximum power could be increased from 125 mW to 560 mW. The tapered section and the RWG section are driven with separate currents. The maximum power was achieved with 10 A current to the tapered section and 350 mA current to the RWG section. The peak emission wavelength can be tuned by more than 2 nm either by changing the tapered section current (at a rate of about 0.4 nm/A) or by changing the temperature (at a rate of about 0.1 nm/ºC, between 10 ºC to 40 ºC).
High-resolution x-ray diffraction and photoluminescence study of high-quality self-catalyzed GaAs nanowires

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Koivusalo, E. S., Hakkarainen, T. V., Guina, M.
Publication date: 17 May 2016
Peer-reviewed: Unknown
Event: Paper presented at Optics and Photonics days, Tampere, Finland.
Keywords: GaAs nanowires, Self-catalyzed, X-ray diffraction, Photoluminescence
Research output: Scientific › Paper, poster or abstract

Novel self-catalyzed GaAs nanowires with electrical contacts

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Rizzo Piton, M., Koivusalo, E. S., Suomalainen, S. J., Hakkarainen, T. V., Guina, M.
Publication date: 17 May 2016
Peer-reviewed: Unknown
Event: Paper presented at Optics and Photonics days, Tampere, Finland.
Research output: Scientific › Paper, poster or abstract

Insight to Nanoparticle Size Analysis—Novel and Convenient Image Analysis Method Versus Conventional Techniques

The aim of this paper is to introduce a new image analysis program “Nanoannotator” particularly developed for analyzing individual nanoparticles in transmission electron microscopy images. This paper describes the usefulness and efficiency of the program when analyzing nanoparticles, and at the same time, we compare it to more conventional nanoparticle analysis techniques. The techniques which we are concentrating here are transmission electron microscopy (TEM) linked with different image analysis methods and X-ray diffraction techniques. The developed program appeared as a good supplement to the field of particle analysis techniques, since the traditional image analysis programs suffer from the inability to separate the individual particles from agglomerates in the TEM images. The program is more efficient, and it offers more detailed morphological information of the particles than the manual technique. However, particle shapes that are very different from spherical proved to be problematic also for the novel program. When compared to X-ray techniques, the main advantage of the small-angle X-ray scattering (SAXS) method is the average data it provides from a very large amount of particles. However, the SAXS method does not provide any data about the shape or appearance of the sample.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Materials Characterization, Department of Signal Processing, Research group: Vision
Authors: Vippola, M., Valkonen, M., Sarlin, E., Honkanen, M., Huttunen, H.
Publication date: 31 Mar 2016
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 11
Issue number: 1
Article number: 169
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Comparative study of defect levels in GaInNAs, GaNAsSb, and GaInNAsSb for high-efficiency solar cells

Background doping and defect levels in GaInNAs, GaNAsSb, and GaInNAsSb solar cells with 1 eV band-gap are reported. Localized point defect induced traps were observed showing broadest defect distribution in GaInNAsSb. Incorporation of Sb reduced the unintentional p-type background doping by an order of magnitude, but increased the capture cross sections of deep levels by three orders of magnitude. The thermal activation energy of the dominating hole trap was increased from 350 meV for GaInNAs to 560 meV for GaNAsSb. Annealing of GaNAsSb solar cells improved the open circuit voltage from 280 mV to 415 mV, owing to the reduction in trap density.
Step down Vascular Calcification Analysis using State-of-the-Art Nanoanalysis Techniques

New insights into the architecture and formation mechanisms of calcific lesions down to the nanoscale open a better understanding of atherosclerosis and its pathogenesis. Scanning electron-and atomic force microscope based nano-analytical characterization techniques were adapted to the assessment of an ex-vivo calcified coronary artery. Human atherosclerotic tissue and bone tissue reside a typical chemistry of Magnesium and Sodium rich Calcium phosphates, identified as whitlockite and Calcium apatite, respectively. Despite the obvious similarities in both chemistry and crystallography, there are also clear differences between calcified vascular tissue and bone such as the highly oriented growth in bone, revealing meso-crystal character, as opposed to the anisotropic character of calcified vascular lesions. While the grain size in vascular calcified plaques is in the range of nanometers, the grain size in bone appears larger. Spherical calcific particles present in both the coronary artery wall and embedded in plaques reveal concentric layers with variations in both organic content and degree of hydration.

Determination of composition and energy gaps of GaInNAsSb layers grown by MBE

We present a method to accurately determine the composition of GaInNAsSb heterostructures and a modified band anti-crossing model to calculate the corresponding bandgaps. The composition determination method is based on combining x-ray diffractometry and energy dispersive x-ray spectroscopy measurements. The modified band anti-crossing model was derived from the model known for GaInNAs and using band-gap composition relations for GaInAs, GaInSb, InAsSb and GaAsSb. The model parameters were defined by fitting with experimental bandgap data retrieved from photoluminescence. For validation and data fitting we used experimental samples with N composition in the range of 0-0.06, In composition from 0 to 0.17, and Sb composition in the range of 0-0.08. All samples were thermally annealed to minimize the band gap shift caused by the short range ordering effects in GaInNAsSb crystal. The modified model yields an excellent fit to the experimental band gap data with an accuracy of ~20 meV, and is a practical tool for designing.
InGaAs-QW VECSEL emitting >1.300-nm via intracavity Raman conversion

We report intracavity Raman conversion of a long-wavelength InGaAs-QW VECSEL to ~1320 nm, the longest wavelength yet achieved by a VECSEL-pumped Raman laser. The setup consisted of a VECSEL capable of emitting >17W at 1180 nm and tunable from 1141-1203 nm and a 30-mm-long KGd(WO4)2 (KGW) Raman crystal in a coupled-cavity Raman resonator. The Raman cavity was separated from the VECSEL resonator by a tilted dichroic mirror, which steers the Raman beam to an output coupler external to the VECSEL. The spectral emission of the VECSEL, and consequently of the Raman laser, was set by a 4-mm-thick quartz birefringent filter in the VECSEL cavity. The KGW Raman laser was capable of emitting 2.5W at 1315 nm, with M2~2.7 and >4% diode-to-Stokes conversion efficiency. The Raman laser emission was tunable from 1295-1340 nm, limited by the free spectral range of the birefringent filter. Spectral broadening of the fundamental emission was observed during Raman conversion. At the maximum Raman laser output power, the total linewidth of the VECSEL spectrum was ~0.7 nm FWHM. As a consequence, the Raman laser emission was also relatively broad (~0.9 nm FWHM). Narrow (<0.2 nm FWHM) Raman emission was obtained by inserting an additional 100 µm etalon within the VECSEL cavity. With this configuration the fundamental intracavity power clamped at its value at the Raman threshold, suggesting an enhanced effective Raman gain, but the maximum output power of the Raman laser was 1.8 W.
Difference frequency modulation of multi-section dual-mode lasers with nanoscale surface gratings

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, University of Strathclyde
Authors: Parrotta, D., Casula, R., Penttinen, J., Leinonen, T., Kemp, A., Guina, M., Hastie, J.
Publication date: 12 Mar 2016

Host publication information
Title of host publication: Vertical External Cavity Surface Emitting Lasers (VECSELs) VI
ISBN (Print): 9781628419696

Publication series
Name: Proceedings of SPIE
ISSN (Print): 0277-786X
DOIs:
10.1117/12.2217593

Bibliographical note
JUFOID=71479
Research output: Scientific - peer-review › Conference contribution

Site-controlled InAs quantum dot chains coupled to surface plasmons

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Research group: Nanophotonics, Facilities and Infrastructure
Authors: Uusitalo, T., Virtanen, H., Viheriälä, J., Salmi, J., Aho, A. T., Dumitrescu, M.
Number of pages: 9
Publication date: 7 Mar 2016

Host publication information
Title of host publication: SPIE Proceedings : Novel In-Plane Semiconductor Lasers XV
Volume: 9767
Publisher: SPIE
Editors: Belyanin, A. A., Smowton, P. M.
Article number: 97670S

Publication series
Name: Proceedings of SPIE
ISSN (Electronic): 0277-786X
Keywords: Frequency modulation, lasers, Nanotechnology, Modulation, Nanoimprint lithography, Quantum dots, terahertz radiation, ultraviolet radiation, distributed feedback laser diodes
DOIs:
10.1117/12.2213888

Bibliographical note
INT=orc,"Aho, Antti T."
JUFOID=71479
Research output: Scientific - peer-review › Conference contribution

Plasmonic hybrid nanostructures are material combinations where the plasmonic metal structure enables optical field confinement, while the other ingredients provide additional functionality, such as emission, absorption or optical nonlinearity. In particular, epitaxial InAs quantum dots (QD) embedded in a single-crystal GaAs matrix are highly efficient quantum emitters that can be integrated as plasmonic-semiconductor hybrids to realize various on-chip functions. In this letter, we demonstrate QD-plasmon coupling in a hybrid structure consisting of site-controlled InAs/GaAs quantum dot chains (QDC) in the proximity of an Ag film. The optical properties of the QDC-plasmon system are investigated using a cleaved-edge photoluminescence (PL) geometry, which allows us to probe the vertical and horizontal polarizations of the PL emission. We demonstrate plasmonic enhancement of both PL decay rate and vertical polarization of the PL emission with decreasing separation of the QDCs and the Ag film. The ability to couple site-controlled InAs QDCs with surface plasmons is a significant step towards exploitation of high quality epitaxial quantum dots as gain or loss compensation in subwavelength plasmonic metal structures, such as waveguide networks, quantum plasmonic structures, and metamaterials.
Exact modeling of finite temperature and quantum delocalization effects on reliability of quantum-dot cellular automata

A thorough simulation study is carried out on thermal and quantum delocalization effects on the feasibility of a quantum-dot cellular automata (QCA) cell. The occupation correlation of two electrons is modeled with a simple four-site array of harmonic quantum dots (QD). QD sizes range from 20 nm to 40 nm with site separations from 20 nm to 100 nm, relevant for state-of-the-art GaAs/InAs semiconductor technology. The choice of parameters introduces QD overlap, which is only simulated properly with exact treatment of strong Coulombic correlation and thermal equilibrium quantum statistics. These are taken into account with path integral Monte Carlo approach. Thus, we demonstrate novel joint effects of quantum delocalization and decoherence in QCA, but also highly sophisticated quantitative evidence supporting the traditional relations in pragmatic QCA design. Moreover, we show the effects of dimensionality and spin state, and point out the parameter space conditions, where the 'classical' treatment becomes invalid.
Color Bricks: Building Highly Organized and Strongly Absorbing Multicomponent Arrays of Terpyridyl Perylenes on Metal Oxide Surfaces

Terpyridine-substituted perylenes containing cyclic anhydrides in the peri position were synthesized. The anhydride group served as an anchor for assembly of the terpyridyl-crowned chromophores as monomolecular layers on metal oxide surfaces. Further coordination with Zn2+ ions allowed for layer-by-layer formation of supramolecular assemblies of perylene imides on the solid substrates. With properly selected anchor and linker molecules it was possible to build high quality structures of greater than ten successive layers by a simple and straightforward procedure. The prepared films were stable and had a broad spectral coverage and high absorbance. To demonstrate their potential use, the synthesized dyes were employed in solid-state dye-sensitized solar cells, and electron injection from the perylene antennas to titanium dioxide was observed.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Chemistry and Bioengineering, Research group: Supramolecular photochemistry, Optoelectronics Research Centre, Research group: Surface Science, Optoelectronics Research Centre, Tampere University of Technology
Pages: 1501-1510
Publication date: Jan 2016
Peer-reviewed: Yes
Early online date: 3 Dec 2015

Publication information
Journal: Chemistry: A European Journal
Volume: 22
Issue number: 4
ISSN (Print): 0947-6539
Ratings:
Scopus rating (2016): CiteScore 5.03 SJR 2.247 SNIP 1.046
Scopus rating (2015): SJR 2.416 SNIP 1.184 CiteScore 4.99
Scopus rating (2014): SJR 2.487 SNIP 1.219 CiteScore 5.51
Scopus rating (2013): SJR 2.604 SNIP 1.239 CiteScore 5.68
Scopus rating (2012): SJR 2.884 SNIP 1.294 CiteScore 5.55
Scopus rating (2011): SJR 2.726 SNIP 1.336 CiteScore 5.46
Scopus rating (2010): SJR 2.527 SNIP 1.292
Scopus rating (2009): SJR 2.499 SNIP 1.365
Scopus rating (2008): SJR 2.887 SNIP 1.407
Scopus rating (2007): SJR 3.233 SNIP 1.532
Scopus rating (2006): SJR 2.911 SNIP 1.505
Scopus rating (2005): SJR 2.62 SNIP 1.454
Scopus rating (2004): SJR 2.32 SNIP 1.472
Scopus rating (2003): SJR 2.156 SNIP 1.45
Scopus rating (2002): SJR 2.554 SNIP 1.472
Scopus rating (2001): SJR 2.834 SNIP 1.612
1550 nm high-power tapered DBR-laser diodes
This paper reports the DBR-RWG surface grating design, the fabrication process, and the output characteristics of tapered DBR laser diodes for applications such as LIDAR and range finding that require eye-safe high-power single-mode coherent light sources. The regrowth-free AlGaInAs/InP DBR lasers exhibited a CW output power as high as 560 mW in single-mode operation at room temperature. At maximum output power the SMSR was 38 dB. By changing the length of the tapered section from 0.5 mm to 4.0 mm, the maximum CW power could be scaled from 125 mW to 560 mW at room temperature.

Difference Frequency Modulation in Dual-Mode Multi-Section DFB Lasers
Dual-longitudinal-mode multi-section DFB lasers with surface gratings were fabricated at 1310 and 1550 nm. Frequency differences between 15 and 1000 GHz were achieved and were modulated by several GHz with rates up to 10 GHz.
Dilute nitride solar cells fabricated by combined MBE-MOCVD epitaxy

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Publication date: 2016
Peer-reviewed: Unknown
Event: Paper presented at 12th International Conference on Concentrator Photovoltaics (CPV-12), Freiburg, Germany.
Electronic versions: CPV-12_Guina_MBE-MOCVD_update
Research output: Scientific › Paper, poster or abstract

High efficiency dilute nitride solar cells: Simulations meet experiments
Parameter extraction procedure and simulation of dilute nitride solar cells are reported. Using PC1D simulation and fitting to experimental current-voltage and external quantum efficiency data, we retrieve the phenomenological material parameters for GaInNAs solar cells. Based on these, we have constructed a model that can explain the changes in short circuit current and open circuit voltage of n-i-p solar cells subjected to rapid thermal annealing. The model reveals that non-annealed MBE-grown GaInNAs material has an n-type doping that evolves to p-type upon rapid thermal annealing. The change of doping type and the shift of the physical location of the pn-junction were confirmed by Kelvin-probe force microscopy. The PC1D modelling was found to work well also for GaInNAs p-i-n solar cells with opposite polarity. It was also found that the GaInNAs lower doping levels in p-i-n solar cells grown at lowered As/III flux ratios were associated with increased carrier lifetimes.

General information
State: Published
Organisation: Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Tukiainen, A., Aho, A., Polojärvi, V., Ahorinta, R., Guina, M.
Number of pages: 20
Pages: 113-132
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Journal of Green Engineering
Volume: 5
Issue number: 3-4
Article number: 8
ISSN (Print): 1904-4720
Ratings:
Scopus rating (2016): SJR 0.132 SNIP 0.27 CiteScore 0.36
Scopus rating (2015): SJR 0.174 SNIP 0.454 CiteScore 0.42
Scopus rating (2014): SJR 0.125 SNIP 0.187 CiteScore 0.25
Scopus rating (2013): SJR 0.143 SNIP 0.191 CiteScore 0.54
Scopus rating (2012): SJR 0.122 SNIP 0.228 CiteScore 0.57
Scopus rating (2011): SJR 0.105 SNIP 1.56
Original language: English
ASJC Scopus subject areas: Environmental Engineering, Energy(all), Physics and Astronomy(all), Materials Science(all)
DOIs: 10.13052/jge1904-4720.5348
Links: http://www.scopus.com/inward/record.url?scp=84983050025&partnerID=8YFLogxK (Link to publication in Scopus)
Source: Scopus
Source-ID: 84983050025
Research output: Scientific › peer-review › Article
High-efficiency III-V solar cells: From drawing board to real devices

The record solar cell conversion efficiency of 46% at concentrated sunlight has been demonstrated by direct bonding technique [1]. Regardless of the high efficiencies obtained using the direct wafer bonding technique, the conventional monolithic approach used in commercial solar cell production has several benefits, including production technology and cost-related factors. And yet, there is a high un-used potential, particularly in new materials that can be grown lattice-matched onto GaAs or Ge substrates. For example, by utilizing dilute nitride materials in multijunction solar cell structures with more than three junctions and by carefully optimizing structural elements and manufacturing technology, efficiencies exceeding 50% is a realistic target [2]. Here we review our theoretical and experimental work carried out on development of various parts of high-efficiency multijunction solar cells based on GaInNAsSb-based materials, i.e., dilute nitrides. First of all, we have developed a molecular beam epitaxy process for GaInNAsSb sub-junction with very high external quantum efficiency exceeding 90%. This building block is essential for achieving high conversion efficiency for GaInP/GaAs/GaInNAsSb triple-junction solar cells. Secondly, the use of a variety of electro-optical simulation tools such as Crosslight APSYS, Silvaco TCAD, PC1D, Essential MacLeod and semi-empirical analytical models combined with experimental work on numerous test samples have helped in fabricating ultra-low specific resistivity tunnel junctions and high-quality sub-junctions based on conventional III-V materials such as GaInP and GaAs to be integrated with the dilute nitride sub-junction. Thirdly, we have also extracted important material specific physical parameters such as carrier lifetimes, mobilities and concentrations for dilute nitrides by matching the simulations to experimental solar cell device characteristics [3]. The extracted parameters are used for refining the simulation models which provide deeper understanding of the device physics. The work done so far has led to a rapid increase in conversion efficiency of our GaInP/GaAs/GaInNAsSb triple-junction solar cells – at a pace of ~5% points/year since 2012. High-efficiency solar cells with efficiencies of 29% and 31% at one sun (AM0 and AM1.5G, respectively) and 36–39% under concentrated sunlight (at ~70 suns) have already been demonstrated [4,5]. Additionally, the effects of various optical and structural design elements related to fabrication of real III-V multijunction solar cells will be critically reviewed. Especially, we will concentrate on the pros and cons of backside reflector structure architectures – including various planar reflector types and Lambertian scatterers – and nanostructured antireflection coatings [6] which are currently widely employed for solar cell photon management. The consequences of adding such elements to the fabrication process and impact on improving the conversion efficiency towards >50% efficiency are assessed.

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Tukiainen, A., Aho, A., Polojärvi, V., Aho, T., Raappana, M., Isoaho, R., Guina, M.
Publication date: 2016
Peer-reviewed: Unknown
Event: Paper presented at Optics and Photonics days, Tampere, Finland.
Electronic versions:
OPD2016_abstract_Tukiainen
Research output: Scientific > Paper, poster or abstract

High-power 1550 nm tapered DBR lasers fabricated using soft UV-nanolprint lithography

Paper reports the DBR-RWG surface grating design, the fabrication process, and the output characteristics of tapered DBR laser diodes for the applications, like for example LiDAR and range finding, that require eye-safe high-power single-mode coherent light sources. The fabricated regrowth-free DBR AlGaNAs/InP lasers exhibited a CW output power as high as 560 mW in single-mode operation at room temperature. At maximum output power the SMSR was 38 dB, proving the excellent behavior of the surface gratings. The tapered section enabled scaling the maximum CW power at room temperature from 125 mW to 560 mW, by increasing its length from 0.5 mm to 4.0 mm. The paper discusses the limitations and performance variation associated to the power scaling by using the tapered section length as a scaling parameter.

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Nanophotonics, Research group: Semiconductor Technology and Applications, Materials Research Laboratory, Turun Yliopisto/Turun Biomateriaalikeskus
Authors: Viheriälä, J., Aho, A. T., Mäkelä, J., Salmi, J., Virtanen, H., Leinonen, T., Dumitrescu, M., Guina, M.
Number of pages: 7
Publication date: 2016

Host publication information
Title of host publication: High-Power Diode Laser Technology and Applications XIV
Publisher: SPIE
Article number: 97330Q
ISBN (Electronic): 9781628419689
Improved properties for packaging materials by nanoscale surface modification and ALD barrier coating

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging, Metsä Board, Bemis, LUT Energy, Masaryk University
Authors: Lahti, J., Lavonen, J., Lahtinen, K., Johansson, P., Seppänen, T., Cameron, D. C.
Number of pages: 23
Pages: 684-706
Publication date: 2016

Host publication information
Title of host publication: TAPPI International Conference on Nanotechnology for Renewable Materials 2016
Volume: 2
Publisher: TAPPI Press
ISBN (Electronic): 9781510828001
ASJC Scopus subject areas: Biotechnology, Biomaterials, Materials Chemistry, Surfaces, Coatings and Films
Links:
http://www.scopus.com/inward/record.url?scp=84992694476&partnerID=8YFLogxK (Link to publication in Scopus)
Source: Scopus
Source-ID: 84992694476
Research output: Scientific - peer-review › Conference contribution

Influence of age-precipitation of Nb-Ti stabilized FeCr alloy on the initial stages of oxide film formation at 650 °C

General information
State: Published
Ministry of Education publication type: D4 Published development or research report or study
Organisations: Optoelectronics Research Centre, Research group: Surface Science, MAX IV Laboratory, Lund University
Authors: Ali-Löytty, H., Hannula, M., Niu, Y., Zakharov, A., Valden, M.
Publication date: 2016

Publication information
Publisher: Lund University, MAX IV Laboratory
Original language: English
Links:
https://www.maxlab.lu.se/cmis/display?id/workspace%3A%2F%2FSpacesStore%2Fbd7dec7f-b5c5-478a-af1e-8fbe1d875fe7
Links:
https://www.maxlab.lu.se/node/2032#I311-PEEM_
Research output: Professional › Commissioned report

Influence of multiwalled carbon nanotubes on the processing behavior of epoxy powder compositions and on the mechanical properties of their fiber reinforced composites
This study reports the preparation of advanced carbon fiber composites with a nanocomposite matrix prepared by dispersing multiwall carbon nanotubes (CNTs) in a powder type epoxy oligomer with two different processing techniques (1) master batch dilution technique and (2) direct mixing (with the help of twin-screw extruder in both cases). The master batch technique shows a better efficiency for the dispersion of the CNTs aggregates. The rheological results demonstrate that the incorporation of the CNTs into the epoxy oligomer leads, as expected, to a marked increase in the viscosity and of the presence of a yield stress point that also depends on the processing technique adopted. Carbon fiber (CFRP) and glass fiber (GFRP) composite materials were produced by electrostatic spraying of the epoxy matrix formulations on the carbon and glass fabric, respectively, followed by calendering and mold pressing. The mechanical properties of the obtained epoxy/CNT-matrix composite materials, such as interlaminar fracture toughness, flexural strength, shear storage and loss moduli are discussed in terms of the processing techniques and fabric material. The incorporation of 1 wt% CNTs in the epoxy matrix results in a relevant increase of the fracture toughness, flexural strength and modulus of both CFRP and GFRP. POLYM. COMPOS., 2015. © 2015 Society of Plastics Engineers

**General information**

State: Published

Ministry of Education publication type: A1 Journal article-refereed

Organisations: Department of Materials Science, Research group: Plastics and Elastomer Technology

Authors: Vaganov, G., Yudin, V., Vuorinen, J., Molchanov, E.

Pages: 2377-2383

Publication date: 2016

Peer-reviewed: Yes

Early online date: 1 Jan 2015

**Publication information**

Journal: Polymer Composites

Volume: 37

Issue number: 8

ISSN (Print): 1548-0569

Ratings:

Scopus rating (2016): SJR 0.562 SNIP 0.887 CiteScore 1.88
Scopus rating (2015): SJR 0.593 SNIP 0.811 CiteScore 1.7
Scopus rating (2014): SJR 0.624 SNIP 0.955 CiteScore 1.58
Scopus rating (2013): SJR 0.654 SNIP 1.053 CiteScore 1.58
Scopus rating (2012): SJR 0.684 SNIP 1.025 CiteScore 1.56
Scopus rating (2011): SJR 0.571 SNIP 0.992 CiteScore 1.4
Scopus rating (2010): SJR 0.541 SNIP 0.764
Scopus rating (2009): SJR 0.626 SNIP 0.854
Scopus rating (2008): SJR 0.554 SNIP 0.804
Scopus rating (2007): SJR 0.827 SNIP 1.358
Scopus rating (2006): SJR 0.708 SNIP 1.25
Scopus rating (2005): SJR 0.518 SNIP 0.695
Scopus rating (2004): SJR 0.578 SNIP 0.821
Scopus rating (2003): SJR 0.85 SNIP 1.019
Scopus rating (2002): SJR 0.931 SNIP 0.94
Scopus rating (2001): SJR 0.709 SNIP 1.067
Scopus rating (2000): SJR 1.153 SNIP 1.277
Scopus rating (1999): SJR 0.743 SNIP 1

Original language: English

DOIs: 10.1002/pc.23419

Source: Bibtex

Source-ID: urn:017f4ad9eea3a92c6d7ea3eb8ae36fa1

Research output: Scientific - peer-review › Article

**In vivo genotoxic effects of uncoated and coated CeO2 NPs administrated to mice by pharyngeal aspiration**

**General information**

State: Published

Organisations: Department of Materials Science, Research group: Materials Characterization, Työterveyslaitos, University of Zaragoza, Leitat Technologic Center

Authors: Catalan, J., Aimonen, K., Hartikainen, M., Vippola, M., Moreno, C., Cabellos, J., Janer, G., Vazquez-Campos, S., Wolff, H., Savolainen, K., Norppa, H.
Linear Channel Modeling and Error Analysis for Intra/Inter Cellular Ca2+ Molecular Communication

The use of intra/inter-cellular calcium ion (Ca2+) signaling for molecular communication (MC) is investigated in this paper. In particular, the elevation of the intracellular Ca2+ concentration upon the external excitation, i.e., Ca2+ wave generation, and the intercellular propagation of Ca2+ wave over consecutive cells are studied for information transmission. The main objective of this paper is to develop a linear channel model for intra/inter-cellular Ca2+ MC. In this context, the end-to-end Ca2+ MC system is studied under three blocks: the wave generation, the gap junctional (intercellular) propagation, and the intracellular propagation. The wave generation block captures the intracellular Ca2+ signaling pathway including the release of Ca2+ from the organelles and the buffers inside a cell, and the intake from the extracellular space. The gap junctional (intercellular) propagation block captures the Ca2+ transition through the gap junctions between the touching cells. The intracellular propagation block defines the effect of the cytoplasmic diffusion. Using the developed blocks for the different biophysical phenomena, the end-to-end channel gain and delay formulas are derived. Furthermore, the bit error probability is studied to reveal the impact of the detection threshold. This work provides the basis for the modeling, analysis and the design of Ca2+ MC systems.

Nonlinear microscopy of nano-objects using excitation beam profiles with engineered phase jumps

We introduce nonlinear microscopy with phase-engineered incident beams. By controlling the phase across an incident Hermite-Gaussian HG10 beam, we vary the longitudinal field component at focus, allowing tailoring of second-harmonic generation from vertically-oriented nanowires.

General information
Optical Energy Transfer and Loss Mechanisms in Coupled Intracavity Light Emitters

Despite the near-unity internal quantum efficiencies (IQEs) demonstrated for GaAs-based light emitters, laser cooling of the ubiquitous III-V semiconductors has not been feasible. The key challenges for III-V optical cooling are the reduced absorption of optical excitation at photon energies well below the bandgap and the strong confinement of light in the high refractive index semiconductors. Here, we investigate the possibility to eliminate the need for light extraction and to eventually relax the requirements of the IQE. This is done using electroluminescence and optical energy transfer within intracavity devices consisting of an AlGaAs/GaAs double heterojunction light emitting diodes and a GaAs p-n-homojunction photodiode enclosed within a single semiconductor cavity. We measure the intracavity energy transfer, i.e., the coupling quantum efficiency (CQE) between the two diodes and estimate loss mechanisms by simultaneously measuring the IV characteristics of the emitter diode and the photocurrent of the absorber diode. The measured CQE of our devices is below 60% due to the mirror, light extraction, nonradiative, and detection losses. While this is far below the state-of-the-art efficiencies, our results suggest that it will be possible to substantially improve the efficiency by adopting the fabrication and design principles used for the best performing photoluminescent emitters.
Optimizing iron alloy catalyst materials for photoelectrochemical water splitting: Passivation of FeCr alloy surface by water vapour using near-ambient-pressure photoelectron spectroscopy

General information
State: Published
Ministry of Education publication type: D4 Published development or research report or study
Organisations: Optoelectronics Research Centre, Research group: Surface Science, MAX IV Laboratory, Lund University
Authors: Lahtonen, K., Hannula, M., Ali-Löytty, H., Hirsimäki, M., Urpelainen, S., Valden, M.
Number of pages: 2
Publication date: 2016

Publication information
Place of publication: Lund, Sweden
Publisher: Lund University, MAX IV Laboratory
Original language: English
Keywords: Synchrotron, Steel, photoelectrochemical water splitting, Passivation, near-ambient-pressure photoelectron spectroscopy, APXPS
Links: https://www.maxlab.lu.se/cmis/display?id=workspace%3A%2F%2FSpacesStore%2Fa92d6a04-214f-4072-9777-93aedd805058

Photoluminescence properties of novel GaAsBi compounds fabricated by molecular beam epitaxy

General information
State: Published
Organisations: Photonics, Research group: ORC
Authors: Hilska, J.
Publication date: 2016
Peer-reviewed: Unknown
Event: Paper presented at Optics and Photonics days, Tampere, Finland.
Keywords: molecular beam epitaxy, GaAsBi, Photoluminescence
Research output: Professional › Commissioned report

Planar fluidic channels on TiO2 nanoparticle coated paperboard
A new design for permanent, low-cost, and planar fluidic channels on TiO2 nanoparticle coated paperboard is demonstrated. Initially superhydrophobic TiO2 nanoparticle coatings can be converted to hydrophilic by ultraviolet (UVA) light, and fluidic channels can be generated. A simple water treatment after the UVA illumination converts the channels permanent when nanoparticles are removed from the illuminated and wetted areas as shown by water contact angle, FE-SEM, XPS, and ToF-SIMS analysis. This suggests new routes for inexpensive, easy to use point-of-care diagnostics based on planar fluidic channels.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: Aerosol Synthesis, Department of Materials Science, Research group: Paper Converting and Packaging, SP Technical Research Institute of Sweden, Laboratory of Paper Coating and Converting, Center for Functional Materials, Abo Akademi University, Turku, AGH
Site-controlled InAs Quantum Dots Coupled to Surface Plasmons

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Department of Electronics and Communications Engineering, Research group: Laboratory for Future Electronics, Research group: Nanophotonics
Authors: Hakkarainen, T. V., Tommila, J. T., Schramm, A., Simonen, J. P. J., Niemi, K. T., Strelow, C., Kipp, T., Kontio, J. M., Guina, M.
PUBLICATION_DATE: 2016
Peer-reviewed: Unknown
Links:
Research output: Scientific › Paper, poster or abstract

Site-controlled InAs Quantum Dots for Plasmonics
We present site-controlled epitaxy of InAs quantum dots (QD) for plasmonics and report QD-plasmon coupling in a hybrid structure consisting of site-controlled InAs/GaAs QD chains in the proximity of an Ag film.

General information
State: Published

The Impact of Social Behavior on the Attenuation and Delay of Bacterial Nanonetworks

Molecular communication (MC) is a new paradigm for developing communication systems that exchanges information through the transmission and reception of molecules. One proposed model for MC is using bacteria to carry information encoded into DNA plasmids, and this is termed bacterial nanonetworks. However, a limiting factor in the models that have been studied so far is the environment considered only in ideal conditions with a single population. This is far from realistic in natural environments, where bacteria co-exist in multiple populations of same and different species, resulting in a very complex social community. This complex community has social interactions that include cooperation, cheating, as well as competition. In this paper, the effects of these social interactions on the information delivery in bacterial nanonetworks are studied in terms of delay, attenuation and data rate. The numerical results show that the cooperative behavior of bacteria improves the performance of delay and attenuation leading to a higher data rate, and this performance can be degraded once their behavior switches towards cheating. The competitive social behavior shows that the performance can degrade delay as well as attenuation leading to slower data rates, as the population with the encoded DNA plasmids are prevented from reaching the receiver. The analysis of social interactions between the bacteria will pave the way for efficient design of bacterial nanonetworks enabling applications such as intra-body sensing, drug delivery, and environmental control against pollution and biological hazards.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Electronics and Communications Engineering, Research group: Emerging Technologies for Nano-Bio-Info-Cogno, Georgia Institute of Technology
Authors: Unluturk, B., Balasubramaniam, S., Akyildiz, I. F.
Pages: 959-969
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: IEEE Transactions on Nanobioscience
Volume: 15
Issue number: 8
ISSN (Print): 1536-1241
Ratings:
Scopus rating (2016): CiteScore 3.04 SJR 0.571 SNIP 1.177
Scopus rating (2015): SJR 0.499 SNIP 1.19 CiteScore 2.92
Scopus rating (2014): SJR 0.62 SNIP 1.246 CiteScore 2.73
Scopus rating (2013): SJR 0.384 SNIP 0.766 CiteScore 1.93
Scopus rating (2012): SJR 0.41 SNIP 1.307 CiteScore 1.97
Scopus rating (2011): SJR 0.5 SNIP 0.819 CiteScore 2.11
Scopus rating (2010): SJR 0.662 SNIP 0.861
Scopus rating (2009): SJR 0.555 SNIP 0.737
Scopus rating (2008): SJR 0.572 SNIP 0.893
Scopus rating (2007): SJR 0.853 SNIP 1.228
Scopus rating (2006): SJR 0.718 SNIP 1.007
Scopus rating (2005): SJR 0.517 SNIP 0.769
Scopus rating (2004): SJR 0.286 SNIP 0.515
Towards material excellence: Evaluation of Tekes' programmes on materials

General information
State: Published
Ministry of Education publication type: D4 Published development or research report or study
Organisations: Department of Materials Science, Research group: Plastics and Elastomer Technology, Virebit Oy
Authors: Timonen, J., Antikainen, M., Das, A., Sarlin, E., Vuorinen, J.
Number of pages: 61
Publication date: 2016

Publication information
Publisher: Tekes
Original language: English
Links:
http://www.tekes.fi/tekes/julkaisut1/towards-material-excellence--42016/
Research output: Professional › Commissioned report

Transformation of ALD grown TiO2 film to topographically microstructured titanium silicide for photonics applications

General information
State: Published
Ministry of Education publication type: D4 Published development or research report or study
Organisations: Optoelectronics Research Centre, Research group: Surface Science, Research group: Nanophotonics
Number of pages: 2
Publication date: 2016

Publication information
Place of publication: Lund
Publisher: Lund University, MAX IV Laboratory
Original language: English
Keywords: titanium silicide, Synchrotron, photoemission electron microscopy
Links:
https://www.maxlab.lu.se/cmis/display?id=workspace%3A%2F%2FSpacesStore%2F80e2da54-8373-4d0c-a4af-8b53b81b0ca3
Links:
https://www.maxlab.lu.se/node/2032#I311-PEEM_ (Reports 2015 - Syncrotron Radiation)
Research output: Professional › Commissioned report

Preparation and antimicrobial characterization of silver-containing packaging materials for meat

In food technology, antimicrobial packaging materials could inhibit or limit the growth of spoilage bacteria and thus improve the shelf life of packaged products. The present study provides new insights into the preparation and antimicrobial characterization of silver-containing packaging materials and their efficacy against typical meat spoilage bacteria. Antimicrobial efficacy of packaging films produced by coextrusion or liquid flame spray process was determined by bioluminescence imaging and conventional antimicrobial assay. Fresh pork sirloin was packaged in selected films and composition of meat microbiota was analyzed by 16S rRNA amplicon sequencing. Shelf life of meat was not affected by any of the silver-containing packaging films, even though meat microbiota mostly consisted of bacteria that were inhibited or retarded in vitro by nanoscale silver coating. This may be due to different release dynamics of silver ions on meat surfaces compared to the circumstances in the antimicrobial assay or interactions between silver and amino acids.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging, Department of Chemistry and Bioengineering, Engineering materials science and solutions (EMASS), Urban circular bioeconomy (UrCirBio), University of Helsinki, Department of Food Hygiene and Environmental Health
Semiconductor lasers are the most widely used type of lasers. This is due to many beneficial properties including compact size, wavelength coverage, and high efficiency. Different semiconductor laser architectures and gain materials can be used to fulfill requirements of different applications. Semiconductor gain materials are easy to tune to emit at desired wavelengths by changing the composition of the material and they can cover a wide range of wavelengths from ultra-violet to mid-infrared. Still, there are some important gaps in the wavelength coverage. Two of these gaps are located at ~600 nm and ~1200 nm, i.e. just below and above the wavelength coverage of traditional GaAs-based semiconductors.

Especially the yellow–red (580–620 nm) part of the visible spectrum is important for applications in the fields of medicine, spectroscopy, astronomy and laser projection.

This work targeted to cover both of the mentioned wavelength gaps by using dilute nitride GaInNAsSb/GaAs quantum well gain material in novel high-power lasers. This thesis discusses especially the fabrication of the dilute nitride gain materials using plasma-assisted molecular beam epitaxy. Incorporating few percent of nitrogen into InGaAs/GaAs QWs can increase the upper wavelength limit of GaAs-based semiconductors up to 1550 nm by reducing band gap and lattice strain. Using this dilute nitride material system, we fabricated the first multi-watt semiconductor disk lasers (SDLs) emitting at 1180 nm and 1230 nm. The output powers exceeded 10 W at both wavelengths. Although frequency doubling is out of the scope of this thesis, it should be mentioned that these lasers emitted multi-watt powers also at the corresponding frequency doubled wavelengths of 590 nm and 615 nm. In addition, this thesis reports a GaInNAsSb/GaAs SDL emitting at 1550 nm, which is the longest wavelength demonstrated for a monolithic GaAs-based SDL.

SDLs, unlike other semiconductor lasers, can emit high-powers (up to 100 W) in nearly diffraction-limited beams and can be efficiently frequency doubled. However, not all applications require multi-watt output powers but would rather benefit from smaller size of the laser source. For this reason we studied also another laser architecture, namely edge-emitting laser diodes. A single-mode laser with record-high output power of 340 mW at 1180 nm, corresponding to yellow (590 nm) frequency-doubled wavelength, was demonstrated. The laser showed also excellent temperature stability, which is important for miniaturization of frequency-doubled lasers.

The laser demonstrations could not have been realized without good understanding of the basic properties of the GaInNAs(Sb) gain material and its fabrication. Studies related to these aspects and to calibration of PA-MBE reactors form an important part of this thesis. Especially, effects of growth temperature and As/III beam equivalent pressure ratio on the grown semiconductor structures were studied.

In summary, this work is concerned with plasma-assisted molecular beam epitaxy of GaInNAsSb/GaAs gain materials. The fabricated materials were used in novel lasers emitting at wide range of technologically important wavelengths that
are difficult to reach otherwise.

Enhancement of second-harmonic generation from silicon nitride with gold gratings
We report strong enhancement of second-harmonic generation in a hybrid nanostructure with gold gratings embedded in a silicon nitride film. Compared to a flat silicon nitride film, the enhancement factor can be as large as 102 to 103 for transverse magnetic and electric polarizations, respectively in good agreement with numerical results calculated using finite element method. For both polarizations, the enhancement arises from a resonance between the waveguide modes and grating.
Organic Molecular Films as Light-Emitting and Light-Confining Material in Rolled-Up AlInP Semiconductor Microtube Resonators

A hybrid inorganic/organic microcavity system is presented in which an AlInP-based rolled-up microtube resonator is combined with a thin film of naphthyl end-capped bithiophene molecules. The film is laterally structured into stripes on top of the AlInP layer system before the roll-up process. During the process, the strained bilayer together with the organic molecular stripes rolls up, and a hybrid microtube is formed. The stripes act as visible-light emitters inside the otherwise passive microtube. Furthermore, they induce a light confinement in the axial direction of the microtube, additional to the radial and azimuthal confinement that is intrinsic to a microtube. As the organic material defines the cavity and represents the emitter at the same time, an efficient light coupling into the three-dimensionally confined optical modes of the microtube resonator is ensured. The hybrid microtubes open up the opportunity for novel experiments on the light–molecule interaction as well as their application in optical components.
750 nm 1.5 W frequency-doubled semiconductor disk laser with a 44 nm tuning range
We demonstrate 1.5 W of output power at the wavelength of 750 nm by intracavity frequency doubling a wafer-fused semiconductor disk laser diode-pumped at 980 nm. An optical-to-optical efficiency of 8.3% was achieved using a bismuth borate crystal. The wavelength of the doubled emission could be tuned from 720 to 764 nm with an intracavity birefringent plate. The beam quality parameter M2 of the laser output was measured to be below 1.5 at all pump powers. The laser is a promising tool for biomedical applications that can take advantage of the large penetration depth of light in tissue in the 700–800 nm spectral range.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research group: Semiconductor Technology and Applications, Frontier Photonics
Authors: Saarinen, E., Lyytikäinen, J., Ranta, S., Rantamäki, A., Sirbu, A., Iakovlev, V., Kapon, E., Okhotnikov, O.
Number of pages: 4
Pages: 4380-4383
Publication date: 1 Oct 2015
Peer-reviewed: Yes

Publication information
Journal: Optics Letters
Volume: 40
Issue number: 19
ISSN (Print): 0146-9592
Ratings:
Scopus rating (2016): SJR 1.864 SNIP 1.658 CiteScore 3.54
Scopus rating (2015): SJR 2.142 SNIP 1.642 CiteScore 3.53
Scopus rating (2014): SJR 2.497 SNIP 2.056 CiteScore 3.86
Scopus rating (2013): SJR 2.458 SNIP 2.095 CiteScore 3.95
Scopus rating (2012): SJR 2.596 SNIP 1.95 CiteScore 3.52
Scopus rating (2011): SJR 2.518 SNIP 2.475 CiteScore 3.69
Scopus rating (2010): SJR 2.669 SNIP 2.293
Scopus rating (2009): SJR 3.167 SNIP 2.665
Scopus rating (2008): SJR 3.408 SNIP 2.378
Scopus rating (2007): SJR 3.489 SNIP 2.102
Scopus rating (2006): SJR 3.143 SNIP 2.334
Scopus rating (2005): SJR 3.251 SNIP 2.483
Scopus rating (2004): SJR 3.521 SNIP 2.718
Scopus rating (2003): SJR 3.708 SNIP 2.573
Scopus rating (2002): SJR 3.702 SNIP 2.39
Scopus rating (2001): SJR 3.62 SNIP 2.244
Scopus rating (2000): SJR 3.416 SNIP 1.705
Scopus rating (1999): SJR 4.044 SNIP 1.699
Original language: English
DOIs: 10.1364/OL.40.004380

Construction of an Interconnected Nanostructured Carbon Black Network: Development of Highly Stretchable and Robust Elastomeric Conductors
In the present work, a strong filler-filler network of conductive carbon black was strategically established in an elastomer matrix, which leads to a unique combination of electrical and mechanical properties. The novelty of our composites was the development of a strong percolated morphology of nanostructured conducting carbon black particles by the
incorporation of relatively large nonreinforcing spherical silica particles, inside the soft elastomer matrix. This technique allowed us to fabricate solution styrene butadiene rubber (S-SBR) composites with outstanding electrical conductivity of 40 S/m, tensile strength ~10 MPa, and extensibility up to 200%. Furthermore, the electrical conductivity was strain-independent up to 50% elongation strain. The electrical conductivity was found to be unaltered after 2000 loading-unloading cycles. This is the first ever report of a robust elastomeric system with such high electrical conductivity where all the basic ingredients used were selected from well-known commercially available raw materials of rubber industry. This work directly manifests an industrially viable method for preparing high-performance elastic conductors that can be utilized in robust and flexible applications.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Engineering materials science and solutions (EMASS), Leibniz-Institut für Polymerforschung Dresden E.V., Technische Universität Dresden, Institut für Werkstoffwissenschaft, Institut für Polymerwerkstoffe E.V., Elkem AS, Silicon Materials
Authors: Bhagavatheswaran, E. S., Parsekar, M., Das, A., Le, H. H., Wiessner, S., Stöckelhuber, K. W., Schmaucks, G., Heinrich, G.
Number of pages: 9
Pages: 21723-21731
Publication date: 17 Sep 2015
Peer-reviewed: Yes

Publication information
Journal: Journal of Physical Chemistry C
Volume: 119
Issue number: 37
ISSN (Print): 1932-7447
Ratings:
Scopus rating (2016): CiteScore 4.48 SJR 1.948 SNIP 1.181
Scopus rating (2015): SJR 1.917 SNIP 1.268 CiteScore 4.68
Scopus rating (2014): SJR 2.027 SNIP 1.448 CiteScore 5.08
Scopus rating (2013): SJR 2.134 SNIP 1.439 CiteScore 5.14
Scopus rating (2012): SJR 2.514 SNIP 1.46 CiteScore 4.98
Scopus rating (2011): SJR 2.32 SNIP 1.457 CiteScore 4.92
Scopus rating (2010): SJR 2.438 SNIP 1.356
Scopus rating (2009): SJR 2.128 SNIP 1.417
Scopus rating (2008): SJR 1.856 SNIP 1.033
Original language: English
ASJC Scopus subject areas: Physical and Theoretical Chemistry, Electronic, Optical and Magnetic Materials, Surfaces, Coatings and Films, Energy(all)
DOIs:
10.1021/acs.jpcc.5b06629
Links:
http://www.scopus.com/inward/record.url?scp=84941928016&partnerID=8YFLogxK (Link to publication in Scopus)
Source: Scopus
Source-ID: 84941928016
Research output: Scientific - peer-review › Article

A single aspiration of rod-like carbon nanotubes induces asbestos-like pulmonary inflammation mediated in part by the IL-1 receptor
Carbon nanotubes (CNT) have been eagerly studied because of their multiple applications in product development and potential risks on health. We investigated the difference of two different CNT and asbestos in inducing proinflammatory reactions in C57BL/6 mice after single pharyngeal aspiration exposure. We used long tangled and long rod-like CNT, as well as crocidolite asbestos at a dose of 10 or 40 μg/mouse. The mice were sacrificed 4 and 16h or 7, 14, and 28 days after the exposure. To find out the importance of a major inflammatory marker IL-1β in CNT-induced pulmonary inflammation, we used etanercept and anakinra as antagonists as well as Interleukin 1 (IL-1) receptor (IL-1R-/-) mice. The results showed that rod-like CNT, and asbestos in lesser extent, induced strong pulmonary neutrophilia accompanied by the proinflammatory cytokines and chemokines 16h after the exposure. Seven days after the exposure, neutrophilia had essentially disappeared but strong pulmonary eosinophilia peaked in rod-like CNT and asbestos-exposed groups. After 28 days, pulmonary granulomas, goblet cell hyperplasia, and Charcot-Leyden-like crystals containing acidophilic macrophages were observed especially in rod-like CNT-exposed mice. IL-1R-/- mice and antagonists-treated mice exhibited a significant decrease in neutrophilia and messenger ribonucleic acid (mRNA) levels of proinflammatory cytokines at 16 h. However, rodlike CNT-induced Th2-type inflammation evidenced by the expression of IL-13 and mucus production was unaffected in IL-1R-/- mice at 28 days. This study provides knowledge about the pulmonary effects
induced by a single exposure to the CNT and contributes to hazard assessment of carbon nanomaterials on airway exposure.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Materials Characterization, Engineering materials science and solutions (EMASS), Finnish Institute of Occupational Health, University of Eastern Finland
Number of pages: 16
Pages: 140-155
Publication date: 1 Sep 2015
Peer-reviewed: Yes

Publication information
Journal: Toxicological Sciences
Volume: 147
Issue number: 1
ISSN (Print): 1096-6080
Ratings:
Scopus rating (2016): SJR 1.53 SNIP 1.142 CiteScore 3.88
Scopus rating (2015): SJR 1.65 SNIP 1.208 CiteScore 4.06
Scopus rating (2014): SJR 1.809 SNIP 1.355 CiteScore 4.24
Scopus rating (2013): SJR 1.712 SNIP 1.353 CiteScore 4.45
Scopus rating (2012): SJR 1.771 SNIP 1.436 CiteScore 4.48
Scopus rating (2011): SJR 1.838 SNIP 1.374 CiteScore 4.4
Scopus rating (2010): SJR 1.846 SNIP 1.365
Scopus rating (2009): SJR 1.992 SNIP 1.57
Scopus rating (2008): SJR 1.736 SNIP 1.285
Scopus rating (2007): SJR 1.459 SNIP 1.294
Scopus rating (2006): SJR 1.31 SNIP 1.167
Scopus rating (2005): SJR 1.264 SNIP 1.196
Scopus rating (2004): SJR 1.292 SNIP 1.204
Scopus rating (2003): SJR 1.112 SNIP 1.183
Scopus rating (2002): SJR 1.161 SNIP 1.278
Scopus rating (2001): SJR 1.036 SNIP 1.189
Scopus rating (2000): SJR 0.668 SNIP 0.867
Scopus rating (1999): SJR 0.429 SNIP 0.618
Original language: English
Keywords: Asbestos, Charcot-Leyden-like crystals, IL-1β, Multiwalled carbon nanotubes, Th2
ASJC Scopus subject areas: Toxicology
DOIs: 10.1093/toxsci/kfv112
Links:
http://www.scopus.com/inward/record.url?scp=84940658114&partnerID=8YFLLogxK (Link to publication in Scopus)
Source: Scopus
Source-ID: 84940658114
Research output: Scientific - peer-review › Article

Highly Nonlinear Dispersion Increasing Fiber for Femtosecond Pulse Generation
The optical pulse evolution in a highly nonlinear normal dispersion-increasing fiber has been considered, both experimentally and theoretically. It was found that large spectral broadening in tapered waveguides could occur without temporal instabilities and impose the linear frequency modulation, i.e., chirp, required for high-quality pulse compression. The pedestal-free pulses have been demonstrated after dechirping in a standard single-mode fiber.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Prokhorov General Physics Institute, Russian Academy of Sciences, Laboratory of Quantum Electronics and Optoelectronics, Ulyanovsk State University
Bringing High-Performance GaInNAsSb/GaAs SOAs to True Data Applications

We experimentally demonstrate the high-speed data processing capabilities of a GaInNAsSb semiconductor optical amplifier operating at 1.55 μm. The investigated structure exhibits good thermal characteristics and fast gain dynamics with 10%-90% recovery time of 55 ps. Successful wavelength conversion of 10-Gb/s signals is reported. A maximum power penalty of <2.4 dB for return to zero formatting and of 1.9 dB for nonreturn to zero is demonstrated.
Influence of relative humidity and physical load during storage on dustiness of inorganic nanomaterials: implications for testing and risk assessment

Dustiness testing using a down-scaled EN15051 rotating drum was used to investigate the effects of storage conditions such as relative humidity and physical loading on the dustiness of five inorganic metal oxide nanostructured powder materials. The tests consisted of measurements of gravimetric respirable dustiness index and particle size distributions.

Water uptake of the powders during 7 days of incubation was investigated as an explanatory factor of the changes. Consequences of these varying storage conditions in exposure modelling were tested using the control banding and risk management tool NanoSafer. Drastic material-specific effects on powder respirable dustiness index were observed with the change in TiO$_2$ from $30\%$ RH (639 mg/kg) to $50\%$ RH (1.5 mg/kg). All five tested materials indicate a decreasing dustiness index with relative humidity increasing from $30$ to $70\%$ RH. Test of powder water uptake showed an apparent link with the decreasing dustiness index. Effects of powder compaction appeared more material specific with both increasing and decreasing dustiness indices observed as an effect of compaction. Tests of control banding exposure models using the measured dustiness indices in three different exposure scenarios showed that in two of the tested materials, one $20\%$ change in RH changed the exposure banding from the lowest level to the highest. The study shows the importance of powder storage conditions prior to tests for classification of material dustiness indices. It also highlights the importance of correct storage information and relative humidity and expansion of the dustiness test conditions specifically, when using dustiness indices as a primary parameter for source strength in exposure assessment.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Materials Characterization, Engineering materials science and solutions (EMASS), Department of Micro and Nanotechnology, Denmark Technical University DTU, Finnish Institute of Occupational Health, CIC biomaGUNE, National Research Centre for the Working Environment
615 nm GaInNAs VECSEL with output power above 10 W

A high-power optically-pumped vertical-external-cavity surface-emitting laser (VECSEL) generating 10.5 W of cw output power at 615 nm is reported. The gain mirror incorporated 10 GaInNAs quantum wells and was designed to have an emission peak in the 1230 nm range. The fundamental emission was frequency doubled to the red spectral range by using an intra-cavity nonlinear LBO crystal. The maximum optical-to-optical conversion efficiency was 17.5%. The VECSEL was also operated in pulsed mode by directly modulating the pump laser to produce light pulses with duration of ~1.5 µs. The maximum peak power for pulsed operation (pump limited) was 13.8 W. This corresponded to an optical-to-optical conversion efficiency of 20.4%.
High power GaInNAs VECSEL emitting at 1230/615 nm
We report a frequency-doubled VECSEL operating at 1230/615 nm. The gain chip was grown by plasma-assisted MBE and comprised 10 GaInNAs quantum wells. Preliminary experiments show an output power of >8 W at 615 nm.

Fabrication of Single Wall Carbon Nanotube Saturable Absorber in the Micro-grooved Single Mode Fiber
We describe technological solution for fabrication of single wall carbon nanotube (SWCNT) based saturable absorber. The mode-locking of Tm/Ho fiber laser with the fiber-integrated SWCNT saturable absorber was confirmed.
High-power 1550 nm tapered DBR lasers fabricated using soft UV-nanoimprint lithography

We report 1.55µm DBR-RWG grating design, the fabrication process, and the output characteristics of tapered DBR lasers patterned using novel soft UV-NIL. DBR lasers exhibited CW output power of 400mW and side-mode-suppression-ratio of 45dB.

Passive resonance sensor based method for monitoring particle suspensions

Control of particle suspensions is needed in several modern industrial processes. A reason for the difficulty in this task has been the lack of a fast and reliable measurement. In this study, we tested the measurement of particle suspension by using a method based on a passive resonance sensor. The relative amounts of dispersing agent and aluminium oxide in the suspension were varied. The studied method yielded signals which depended on the complex permittivity of the suspension. The results indicated that we were able to measure information that can be used as feedback for the suspension preparation process. In addition, the tested instrumentation was simple and robust and thus this method may allow online measurements directly from the industrial processes.
Fabrication of electrospun poly(D,L lactide-co-glycolide)80/20 scaffolds loaded with diclofenac sodium for tissue engineering Surgery

Background: Adaptation of nanotechnology into materials science has also advanced tissue engineering research. Tissues are basically composed of nanoscale structures hence making nanofibrous materials closely resemble natural fibers. Adding a drug release function to such material may further advance their use in tissue repair. Methods: In the current study, bioabsorbable poly(D,L lactide-co-glycolide)80/20 (PDLGA80/20) was dissolved in a mixture of acetone/dimethylformamide. Twenty percent of diclofenac sodium was added to the solution. Nanofibers were manufactured using electrospinning. The morphology of the obtained scaffolds was analyzed by scanning electron microscopy (SEM). The release of the diclofenac sodium was assessed by UV/Vis spectroscopy. Mouse fibroblasts (MC3T3) were seeded on the scaffolds, and the cell attachment was evaluated with fluorescent microscopy. Results: The thickness of electrospun nanomats was about 1 mm. SEM analysis showed that polymeric nanofibers containing drug particles formed very interconnected porous nanostructures. The average diameter of the nanofibers was 500 nm. Drug release was measured by means of UV/Vis spectroscopy. After a high start peak, the release rate decreased considerably during 11 days and lasted about 60 days. During the evaluation of the release kinetics, a material degradation process was observed. MC3T3 cells attached to the diclofenac sodium-loaded scaffold. Conclusions: The nanofibrous porous structure made of PDLGA polymer loaded with diclofenac sodium is feasible to develop, and it may help to improve biomaterial properties for controlled tissue repair and regeneration.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Electronics and Communications Engineering, Department of Materials Science, Keele University, United Kingdom, AUVA Research Center, Austrian Cluster for Tissue Regeneration, Ludwig Boltzmann Institute for Experimental and Clinical Traumatology, Department of Experimental Trauma Surgery, Technical University Munich
Publication date: 5 Jun 2015
Peer-reviewed: Yes

Publication information
Journal: European Journal of Medical Research
The Role of Groove Periodicity in the Formation of Site-Controlled Quantum Dot Chains

Structural and optical properties of InAs quantum dot (QD) chains formed in etched GaAs grooves having different periods from 200 to 2000 nm in [010] orientation are reported. The site-controlled QDs were fabricated by molecular beam epitaxy on soft UV-nanoimprint lithography-patterned GaAs(001) surfaces. Increasing the groove periods decreases the overall QD density but increases the QD size and the linear density along the groove direction. The effect of the increased QD size with larger periods is reflected in ensemble photoluminescence measurements as redshift of the QD emission. Furthermore, we demonstrate the photoluminescence emission from single QD chains.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Research group: Semiconductor Technology and Applications, Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Schramm, A., Hakkarainen, T. V., Tommila, J., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 28 May 2015
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 10
Article number: 242
High temperature oxidation tests for the high velocity solution precursor flame sprayed manganese-cobalt oxide spinel protective coatings on SOFC interconnector steel

High velocity solution precursor flame spray process was used to deposit MnCo1.9Fe0.1O4 and Mn1.5Co1.5O4 coatings on Crofer 22 APU ferritic stainless steel samples. The solution precursors were manufactured by diluting metal nitrates into deionized water. The as-sprayed coatings were oxidized at 850 degrees C for 500 h to evaluate Cr-barrier and electrical properties. The post-mortem studies were performed with various qualitative and quantitative elemental analysis methods and a four-point measurement was used for the area specific resistance studies. The as-sprayed coatings were formed of single crystallite nanoparticles (10-20 nm) and polycrystalline sub-micron particles (100-500 nm). The small particle and crystallite size showed strong sintering behavior during the oxidation cycle. Cr-migration was fully prevented thought the oxidized coatings. The surface topography and grain growth dominated the electrical properties during the test cycle. Copyright (C) 2015, Hydrogen Energy Publications, LLC. Published by Elsevier Ltd. All rights reserved.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Research group: Surface Engineering, Research group: Materials Characterization, Research group: Ceramic materials, Engineering materials science and solutions (EMASS), Univ Toronto, University of Toronto, Dept Mat Sci & Engn, Univ Toronto, University of Toronto, Dept Mech & Ind Engn
Authors: Puranen, J., Laakso, J., Honkanen, M., Heinonen, S., Kylmälahti, M., Lugowski, S., Coyle, T. W., Kesler, O., Vuoristo, P.
Number of pages: 12
Pages: 6216-6227
Publication date: 18 May 2015
Peer-reviewed: Yes

Publication information
Volume: 40
Issue number: 18
ISSN (Print): 0360-3199
Ratings:
Scopus rating (2016): CiteScore 3.74 SJR 1.142 SNIP 1.286
Scopus rating (2015): SJR 1.294 SNIP 1.319 CiteScore 3.46
Scopus rating (2014): SJR 1.212 SNIP 1.494 CiteScore 3.54
Scopus rating (2013): SJR 1.278 SNIP 1.467 CiteScore 3.38
Scopus rating (2012): SJR 1.515 SNIP 1.729 CiteScore 3.96
Scopus rating (2011): SJR 1.456 SNIP 1.837 CiteScore 4.42
Scopus rating (2010): SJR 1.589 SNIP 1.871
Scopus rating (2009): SJR 1.333 SNIP 1.885
Spontaneous formation of nanostructures by surface spinodal decomposition in GaAs1-xBix epilayers

We report on the spontaneous formation of lateral composition modulations (LCMs) in Ga(As, Bi) epilayers grown by low-temperature (<300 degrees C) molecular beam epitaxy (MBE) on GaAs(001). Both cross-section and plan-view transmission electron microscopy techniques are used to investigate the nature of the LCMs, consisting of Bi-rich cylinder-like nanostructures lying along the [001] growth direction. The observed LCMs are the consequence of a two-dimensional phase separation process occurring at the surface of the growing epilayers, and their columnar nature is consistent with a surface-directed spinodal decomposition process. Although LCMs are thermodynamically driven, we show how they can be kinetically controlled, in particular, through the As/Ga flux ratio and the substrate temperature. This is a result of LCMs developing from surface atomic diffusion processes, since the atomic dimer configurations on the surface alter adatom diffusivity. The significant role of the surface reconstructions is also discussed. (c) 2015 AIP Publishing LLC.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Tampere University of Technology, Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Frontier Photonics, Paul-Drude-Institut für Festkörperelektronik
Authors: Luna, E., Wu, M., Puustinen, J., Guina, M., Trampert, A.
Number of pages: 5
Publication date: 14 May 2015
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Physics
Volume: 117
Issue number: 18
Article number: 185302
ISSN (Print): 0021-8979

Ratings:
Scopus rating (2016): CiteScore 1.72 SJR 0.632 SNIP 0.815
Scopus rating (2015): SJR 0.618 SNIP 0.84 CiteScore 1.57
Scopus rating (2014): SJR 1.005 SNIP 1.18 CiteScore 2.04
Scopus rating (2013): SJR 1.165 SNIP 1.317 CiteScore 2.24
Scopus rating (2012): SJR 1.305 SNIP 1.294 CiteScore 2.13
Scopus rating (2011): SJR 1.373 SNIP 1.318 CiteScore 2.24
Scopus rating (2010): SJR 1.47 SNIP 1.195
Scopus rating (2009): SJR 1.518 SNIP 1.238
Scopus rating (2008): SJR 1.667 SNIP 1.338
Scopus rating (2007): SJR 1.708 SNIP 1.395
Scopus rating (2006): SJR 1.947 SNIP 1.649
Scopus rating (2005): SJR 2.034 SNIP 1.627
We present a light source that can generate a pulse train with an extremely high repetition rate, tens of watts of average output power, and a low-divergence output beam. This unique combination of system characteristics is achieved with single-stage amplification of a passively harmonically mode-locked semiconductor disk laser in a tapered Yb-doped double-clad fiber. With the short-length tapered fiber amplifier an amplification factor $>17$ dB is reached, while preserving the 930-fs pulse duration of the semiconductor disk laser. The demonstrated pulse source with a beam quality factor

**193-GHz 53-W Subpicosecond Pulse Source**
Scaling the Power and Tailoring the Wavelength of Semiconductor Disk Lasers

Optically pumped semiconductor disk lasers (SDLs) provide a unique combination of high output power, high beam quality and possible emission wavelengths spanning from the ultraviolet to the mid-infrared spectral range. In essence, SDLs combine the wavelength versatility of semiconductor gain media with the power scaling principles of optically pumped solid state lasers. The emission wavelength of SDLs can be tailored to match the desired application simply by altering the composition of the gain material. High power operation, however, requires efficient thermal management, which can be realized using thin structures that are integrated with industrial diamond heat spreaders. The main objective of this thesis was to develop methods for increasing the output power of optically pumped SDLs, especially in challenging wavelength regions. The work included integrating SDL gain elements onto diamond heat spreaders using thin intermediate gold layers. This configuration enabled 45–50 % higher output powers than conventional bonding with indium solder. In addition, the reflectivity of the SDL gain mirror was enhanced using a semiconductor-dielectric-metal compound mirror. This procedure enabled 30 % thinner mirror structures when compared with the conventional design, where the reflectivity of the semiconductor mirror is enhanced with a metal layer. Finally, thin GaAs-based semiconductor mirrors were integrated with InP-based active regions. Such integration is necessary for high power operation in the spectral range 1.3–1.6 µm, because InP-based compounds for a highly reflective thin mirror section are not available. The configuration enabled record-high output powers of 6.6 W and 4.6 W at the wavelengths of 1.3 µm and 1.58 µm, respectively. The second objective of this thesis was to generate high output powers in single-frequency operation and via intracavity frequency-doubling. In single-frequency operation, record-high output powers of 4.6 W and 1 W were demonstrated at the wavelengths of 1.05 µm and 1.56 µm, respectively. Such light sources are required for numerous applications including free-space communications and high resolution spectroscopy. In addition, second-harmonic generation was demonstrated with SDLs emitting at 1.3 µm and 1.57 µm. The output powers reached 3 W at 650 nm and 1 W at 785 nm, which represent record-high output powers from SDLs in this wavelength range. These types of lasers could be especially useful in biophotonics and medical applications.
Passive mode-locking of a Tm,Ho:KLu(WO₄)₂ laser operating at 2060 nm using different designs of InGaAsSb quantum-well based semiconductor saturable absorber mirrors (SESAMs) is demonstrated. The self-starting mode-locked laser delivers pulse durations between 4 and 8 ps at a repetition rate of 93 MHz with maximum average output power of 155 mW. Mode-locking performance of a Tm,Ho:KLu(WO₄)₂ laser is compared for usage of a SESAM to a single-walled carbon nanotube saturable absorber.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Frontier Photonics, Campus Sescelades, Max Born Institute, Sofia University St. Kliment Ohridski, Física i Cristallografia de Materials i Nanomaterials, Universitat Rovira i Virgili
Number of pages: 6
Pages: 4614-4619
Publication date: 23 Feb 2015
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 23
Issue number: 4
ISSN (Print): 1094-4087
Ratings:
Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
Scopus rating (2003): SJR 2.688 SNIP 2.193
Scopus rating (2002): SJR 1.547 SNIP 1.673
Scopus rating (2001): SJR 1.442 SNIP 1.39
Scopus rating (2000): SJR 1.246 SNIP 0.714
Scopus rating (1999): SJR 1.381 SNIP 0.838
Original language: English
ASJC Scopus subject areas: Atomic and Molecular Physics, and Optics
DOIs:
10.1364/OE.23.004614
Source: Scopus
Source-ID: 84924194860
Research output: Scientific - peer-review › Article

1180 nm CW VECSEL emitting 50 W

General information
Décalage de la bande de transmission des fibres à bande interdite photonique remplies de liquide avec le contraste d'indice

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Optics, Laboratoire Charles Fabry, Institut d'Optique, Univ Paris-Sud
Publication date: 2015

Host publication information
Title of host publication: 18e Conférence HORIZONS de l’Optique
Article number: P29

Bibliographical note
ISBN kysytty, HO.
Research output: Professional › Conference contribution

Deposition of silver nanoparticles on carbon nanotube arrays

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics, Department of Materials Science, Research group: Materials Characterization, Research group: Aerosol Synthesis, Swiss Federal Institute of Technology, Zurich, Switzerland
Authors: Roumeli, E., Harra, J., Juuti, P., Honkanen, M., Daraio, C., Mäkelä, J.
Publication date: 2015

Host publication information
Title of host publication: AT 2015, Aerosol Technology : June 15-17, 2015, Tampere, Finland

Bibliographical note
ORG=fys,0.5
ORG=mol,0.5
Research output: Professional › Conference contribution

Effect of Multiwalled Carbon Nanotubes on the Properties of EPDM/NBR Dissimilar Elastomer Blends

In the presence of multiwalled carbon nanotubes (MWCNT), polar nitrile-butadiene rubber (NBR) and nonpolar ethylene propylene diene rubber (EPDM) blends were prepared following a melt mixing method. For the preparation of MWCNT filled EPDM/NBR blends, two mixing methods were used: direct mixing and the masterbatch dilution method. Various physical, mechanical, and morphological properties are explored to elucidate the dispersion behavior of MWCNTs. It was concluded that the preparation method influences the dispersion of the nanotubes in different rubber phases and the properties of these blends are controlled by the degree of dispersion of the nanotubes in the two phases.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Enhanced in-line detection, cleaning and repair of nano-scale defects in thin-films used for flexible photovoltaic and food packaging applications

General information
State: Published
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging
Authors: Lahti, J.
Publication date: 2015
Peer-reviewed: Unknown

Bibliographical note
poster
Research output: Scientific › Paper, poster or abstract

Enhanced in-line detection, cleaning and repair of nano-scale defects in thin-films used for flexible photovoltaic and food packaging applications

General information
State: Published
Enhanced in-line detection, cleaning and repair of nano-scale defects in thin-films used for flexible photovoltaic and food packaging applications

Fibres à cœur liquide pour la génération de paires de photons corréllés émancipées du bruit Raman

Generation of a broad IR spectrum and N-soliton compression in a longitudinally inhomogeneous dispersion-shifted fibre
Generation of bound states of pulses in a soliton laser with complex relaxation of a saturable absorber

A numerical model of a soliton fibre laser with a semiconductor saturable absorber mirror (SESAM), characterised by the complex dynamics of absorption relaxation, is considered. It is shown that stationary bound states of pulses can be formed in this laser as a result of their interaction via the dispersion-wave field. The stability of stationary bound states of several pulses is analysed. It is shown that an increase in the number of pulses in a stationary bound state leads eventually to its decay and formation of a random bunch. It is found that the bunch stability is caused by the manifestation of nonlinear self-phase modulation, which attracts pulses to the bunch centre. The simulation results are in qualitative agreement with experimental data.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Frontier Photonics, Ulyanovsk State University
Authors: Zolotovskii, I. O., Korobko, D. A., Gumenyuk, R. V., Okhotnikov, O. G.
Number of pages: 9
Pages: 26-34
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Quantum Electronics
Volume: 45
Issue number: 9
ISSN (Print): 1063-7818
Ratings:
Scopus rating (2016): SJR 0.491 SNIP 1.101 CiteScore 1.13
Graphene–Rubber Nanocomposites

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Materials Science, Research group: Plastics and Elastomer Technology
Authors: Das, A., Heinrich, G.
Number of pages: 4
Pages: 894-897
Publication date: 2015

Host publication information
Title of host publication: Encyclopedia of Polymeric Nanomaterials
Place of publication: Berlin, Heidelberg
Publisher: Springer
Editors: Kobayashi, S., Müllen, K.
ISBN (Print): 978-3-642-29648-2
DOIs:
10.1007/978-3-642-36199-9_293-1
Research output: Scientific - peer-review > Chapter

III-N/Bu-V based high efficiency solar cells: recent developments ad future prospects

General information
State: Published
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Guina, M.
Publication date: 2015
Peer-reviewed: Unknown
Imagerie fantôme temporelle: Première démonstration expérimentale

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Research area: Optics, Department of Physics, Research group: Nonlinear Fiber Optics
Authors: Ryczkowski, P., Barbier, M., Friberg, A. T., Dudley, J. M., Genty, G.
Publication date: 2015

Host publication information
Title of host publication: 18e Conférence HORIZONS de l’Optique
Article number: P8

Bibliographical note
ISBN kysytty, HO.
Research output: Professional › Conference contribution

Lasing in ultrasmall microdisc/microring cavities with active region based on InAs/InGaAs/GaAs quantum dots

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre, Univ Eastern Finland, University of Eastern Finland, Inst Photon, St. Petersburg Academic University
Authors: Karpov, D., Laukkanen, J., Tommila, J., Svirko, Y., Kryzhanovskaya, N., Zhukov, A., Lipovskii, A.
Publication date: 2015

Host publication information
Title of host publication: Northern Optics & Photonics 2015 : June 2-4, 2015, Lappeenranta, Finland
Place of publication: Joensuu
Publisher: University of Eastern Finland
Research output: Scientific › Conference contribution

Layered Double Hydroxide (LDH)-Based Rubber Nanocomposites

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Materials Science, Research group: Plastics and Elastomer Technology
Authors: Basu, D., Das, A., Heinrich, G.
Number of pages: 6
Pages: 1050-1055
Publication date: 2015

Host publication information
Title of host publication: Encyclopedia of Polymeric Nanomaterials
Place of publication: Berlin, Heidelberg
Publisher: Springer
Editors: Kobayashi, S., Müllen, K.
ISBN (Print): 978-3-642-29648-2
DOI: 10.1007/978-3-642-29648-2_295
Source: Bibtex
Source-ID: urn:fo:c6a909a39c23051346c1d414b4184
Research output: Scientific - peer-review › Chapter
Micro- and nano-scale defect detection, cleaning and repair techniques to improve the quality of nanoscale barrier coatings

Microdisk lasers based on GaInNAsSb/GaAsN quantum well active region

Microdisk lasers based on novel InGaAsNSb/GaAsN quantum well active region are developed and studied under optical pumping. Room temperature lasing at 1.55 µm in 2.3 µm in diameter microdisks with InGaAsNSb/GaAsN QW is demonstrated.
Monolithic GaInNAsSb/GaAs VECSEL emitting at 1550 nm

We report the first monolithic GaAs-based vertical external-cavity surface-emitting laser (VECSEL) operating at 1550 nm. The VECSEL is based on a gain mirror which was grown by plasma-assisted molecular beam epitaxy and comprises 8 GaInNAsSb/GaAs quantum wells and an AlAs/GaAs distributed Bragg reflector. When pumped by an 808 nm diode laser, the laser exhibited an output power of 80 mW for a mount temperature of 16 °C.

Nanoscale surface modification and barrier coatings for packaging materials

Non-Instantaneous Polarization Dynamics in Resonant Dielectrics
Optical properties and thermionic emission in solar cells with InAs quantum dots embedded within GaNAs and GaInNAs

The optical properties of p-i-n solar cells comprised of InAs quantum dots embedded within GaNAs and GaInNAs quantum wells are reported. Strain compensating and mediating GaNAs and GaInNAs layers shift the photoluminescence emission as well as absorption edge of the quantum dots to longer wavelengths. GaNAs and GaInNAs quantum wells contribute also to extending the absorption edge. In addition, the use of GaNAs and GaInNAs layers enhances the thermal escape of electrons from QDs by introducing steps for electrons to the GaAs conduction band.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Augmented Human Activities (AHA), Frontier Photonics, Faculty of Exact Sciences and Engineering, Hyperion University
Authors: Polojärvi, V., Pavelescu, E., Schramm, A., Tukiainen, A., Aho, A., Puustinen, J., Guina, M.
Number of pages: 4
Pages: 122-125
Publication date: 2015
Peer-reviewed: Yes
Early online date: 19 Jun 2015

Publication information
Journal: Scripta Materialia
Volume: 108
ISSN (Print): 1359-6462
Ratings:
Scopus rating (2016): SJR 1.901 SNIP 1.696 CiteScore 3.71
Scopus rating (2015): SJR 2.3 SNIP 1.876 CiteScore 3.54
Scopus rating (2014): SJR 2.744 SNIP 2.124 CiteScore 3.55
Scopus rating (2013): SJR 2.347 SNIP 1.975 CiteScore 3.19
Scopus rating (2012): SJR 2.309 SNIP 2.022 CiteScore 3.01
Scopus rating (2011): SJR 2.333 SNIP 2.108 CiteScore 3.21
Scopus rating (2010): SJR 2.445 SNIP 2.125
Scopus rating (2009): SJR 2.574 SNIP 2.02
Scopus rating (2008): SJR 2.634 SNIP 2.128
Scopus rating (2007): SJR 2.229 SNIP 2.174
Scopus rating (2006): SJR 2.1 SNIP 1.915
Scopus rating (2005): SJR 1.831 SNIP 1.915
Scopus rating (2004): SJR 1.464 SNIP 1.731
Scopus rating (2003): SJR 1.499 SNIP 1.709
Scopus rating (2002): SJR 1.509 SNIP 1.345
Scopus rating (2001): SJR 1.301 SNIP 1.361
Scopus rating (2000): SJR 1.268 SNIP 1.123
Scopus rating (1999): SJR 1.53 SNIP 1.162
Original language: English
ASJC Scopus subject areas: Materials Science(all), Condensed Matter Physics
Keywords: Quantum dot, Quantum well, Solar cell, Strain engineering, Thermal escape
DOIs: 10.1016/j.scriptamat.2015.06.033

Bibliographical note
EXT="Pavelescu, Emil-Mihai"
Source: Scopus
Source-ID: 84936804579
Research output: Scientific - peer-review › Article
Power and wavelength scaling using semiconductor disk laser - bismuth fiber MOPA systems

We present a master oscillator power amplifier (MOPA) system that comprises a mode-locked semiconductor disk laser (SDL) emitting at 1.33 μm and a bismuth-doped fiber amplifier. The mode-locked SDL was fabricated by wafer bonding an InP-based gain section with a GaAs-based distributed Bragg reflector (DBR) using (3-Mercaptopropyl)trimethoxysilane. The bismuth-doped fiber amplifier was pumped with a continuous wave SDL emitting at 1.18 μm. The MOPA system produced pulses at a repetition rate of 827 MHz with a pulse energy of 0.62 nJ, which corresponds to an average output power of more than 0.5 W.

Quantum dot semiconductor disk laser at 1.3 μm

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Ioffe Institute, Polytekhnicheskaya str. 26, Saint-Petersburg 194021, Saint-Petersburg Polytechnical University, Saint-Petersburg 195251
Number of pages: 4
Pages: 3400-3403
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Optics Letters
Volume: 40
Issue number: 14
ISSN (Print): 0146-9592
Ratings:
Recent progress in wafer-fused VECSELs emitting in the 1310 nm waveband

Over the last years we have continuously improved the performance of 1300 nm band VECSELs with wafer fused gain mirrors in the intra-cavity diamond and the flip-chip heat dissipation configurations. In this work we present recent results for gain mirrors that implement both heat-dissipation schemes applied to the same fused gain mirror structure. We demonstrate record high output powers of 7.1 W in the intra-cavity diamond heat-spreader configuration and 6.5 W in the flip-chip heat dissipation scheme. These improvements are achieved due to optimization of the wafer fused gain mirror structure based on AlGaInAs/InP-active region fused to AlAs-GaAs distributed Bragg reflector (DBR) and application of efficient methods of bonding semiconductor gain mirror chips to diamond heatspreaders.

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Frontier Photonics, École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland
Authors: Sirbu, A., Rantamäki, A., Iakolev, V., Mereuta, A., Caliman, A., Volet, N., Lyytikäinen, J., Okhotnikov, O., Kapon, E.
Number of pages: 7
Publication date: 2015

Host publication information
Place of publication: BELLINGHAM
Publisher: SPIE
Editor: Guina, M.

Publication series
Name: Proceedings of SPIE
Publisher: SPIE-INT SOC OPTICAL ENGINEERING
Volume: 9349
ISSN (Print): 0277-786X
Keywords: Wafer-fused vertical-external-cavity surface-emitting lasers (VECSELs), wafer-fused gain mirrors, optically pumped VECSELs, photonics technology, SEMICONDUCTOR DISK LASER
DOIs:
10.1117/12.2079752
Source: WOS
Source-ID: 000353134900006
Research output: Scientific - peer-review » Conference contribution
Roll-to-roll coating by liquid flame spray nanoparticle deposition
Nanostructured coatings have been prepared on a flexible, moving paperboard using deposition of ca. 10-50-nm-sized titanium dioxide and silicon dioxide nanoparticles generated by a liquid flame spray process, directly above the paperboard, to achieve improved functional properties for the material. With moderately high production rate (~ g/min), the method is applicable for thin aerosol coating of large area surfaces. LFS-made nanocoating can be synthesized e.g. on paper, board or polymer film in roll-to-roll process. The degree of particle agglomeration is governed by both physicochemical properties of the particle material and residence time in aerosol phase prior to deposition. By adjusting the speed of the substrate, even heat sensitive materials can be coated. In this study, nanoparticles were deposited directly on a moving paperboard with line speeds 50-300 m/min. Functional properties of the nanocoating can be varied by changing nanoparticle material; e.g. TiO2 and SiO2 are used for changing the surface wetting properties. If the liquid precursors are dissolved in one solution, synthesis of multi component nanoparticle coatings is possible in a one phase process. Here, we present analysis of the properties of LFS-fabricated nanocoatings on paperboard. The thermophoretic flux of nanoparticles is estimated to be very high from the hot flame onto the cold substrate. A highly hydrophobic coating was obtained by a mass loading in the order of 50-100 mg/m² of titanium dioxide on the paperboard.

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: Aerosol Synthesis, Department of Materials Science, Research group: Paper Converting and Packaging, Engineering materials science and solutions (EMASS), Abo Akad Univ, Abo Akademi University, Dept Phys
Authors: Mäkelä, J. M., Haapanen, J., Aromaa, M., Teisala, H., Tuominen, M., Stepien, M., Saarinen, J. J., Toivakka, M., Kuusipalo, J.
Number of pages: 6
Pages: 37-42
Publication date: 2015

Host publication information
Title of host publication: Materials Research Society Symposium Proceedings
Volume: 1747
Publisher: MATERIALS RESEARCH SOCIETY
ISBN (Print): 9781510806245
ASJC Scopus subject areas: Materials Science(all), Condensed Matter Physics, Mechanical Engineering, Mechanics of Materials
DOIs:
10.1557/opl.2015.530
Links:
http://www.scopus.com/inward/record.url?scp=84938922555&partnerID=8YFLogxK (Link to publication in Scopus)

SESAM mode-locked Tm: CALGO laser at 2 µm
GaSb-based SESAM is successfully employed for passive mode locking of a Tm³⁺: CaGdAlO₄ laser operating near 2 µm. The pulse duration is around 650 fs at a repetition rate ~100 MHz.

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Research group: Semiconductor Technology and Applications, Optoelectronics Research Centre, Frontier Photonics, Max Born Institute, Shanghai Jiaotong University, Jiangsu Normal University, Vital Materials Co., Limited, Dipartimento di Ingegneria Industriale e Dell'Informazione, Universitat Rovira i Virgili, Belarusian National Technical University
Publication date: 2015

Host publication information
Title of host publication: Advanced Solid State Lasers, ASSL 2015
Publisher: Optical Society of America OSA
Supercontinuum generation as a signal amplifier

Supercontinuum white-light generation in optical fibers is a process that is known for its extreme sensitivity toward fluctuations of the input pulses, giving rise to a strong amplification of input noise. Such noise amplification has been recognized as a detrimental effect that prevents compression of the broad white-light spectra into a few-cycle pulse. Here, we show that the same effect can be exploited to amplify and recover faint modulation signals to an extent that seems impossible with any electronic method. We experimentally demonstrate the deterministic amplification of faint amplitude modulation signals by up to 60 dB. As we show from numerical simulations, this amplification process arises from the interaction dynamics between solitons and dispersive radiation in the fiber. The resulting all-optic signal restoration provides a new photonic building block that enables signal processing at virtually unlimited processing speeds.

Te-doping of self-catalyzed GaAs nanowires

Tellurium (Te)-doping of self-catalyzed GaAs nanowires (NWs) grown by molecular beam epitaxy is reported. The effect of Te-doping on the morphological and crystal structure of the NWs is investigated by scanning electron microscopy (SEM) and high-resolution transmission electron microscopy (TEM). The study reveals that the lateral growth rate increases and axial growth rate decreases with increasing Te doping level. The changes in the NW morphology can be reverted to some extent by changing the growth temperature. At high doping levels, formation of twinning superlattice is observed alongside with the \(\{111\}\)-facetted sidewalls. Finally, the incorporation of Te is confirmed by Raman spectroscopy.
Towards high power flip-chip long-wavelength semiconductor disk lasers

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research group: Surface Science, Frontier Photonics
Authors: Rantamäki, A., Saarinen, E., Lyytikäinen, J., Heikkinen, J., Kontio, J., Lahtonen, K., Valden, M., Okhotnikov, O.
Publication date: 2015
Peer-reviewed: Yes

Host publication information
Title of host publication: Proceedings of SPIE
Volume: 9349
Publisher: SPIE
ISBN (Electronic): 9781628414394
DOIs:
10.1117/12.2076795
Ultra barrier protection for paper packaging using atomic layer deposition

General information
State: Published
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging
Authors: Lahti, J.
Publication date: 2015

Publication information
Year: 2015
Original language: English
Links:
http://nanomend.eu/

Bibliographical note
Public flyer published by EU project NanoMend
Research output: Scientific › Other contribution

Mode-locked 1.33 \( \mu \)m semiconductor disk laser with a bismuth-doped fiber amplifier

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research group: Semiconductor Technology and Applications, Frontier Photonics, Fiber Optics Research Center, Russian Academy of Sciences
Number of pages: 2
Pages: 123-124
Publication date: 16 Dec 2014

Host publication information
Title of host publication: ISLC 2014, IEEE 24th International Semiconductor Laser Conference, 7-10 September, 2014, Mallorca, Spain
Publisher: The Institute of Electrical and Electronics Engineers, Inc.
Article number: 6987481
ISBN (Print): 9781479957217

Publication series
Name: IEEE International Semiconductor Laser Conference
ASJC Scopus subject areas: Electrical and Electronic Engineering, Atomic and Molecular Physics, and Optics
DOI:
10.1109/ISLC.2014.194
Links:
http://www.scopus.com/inward/record.url?scp=84920126178&partnerID=8YFLogxK (Link to publication in Scopus)

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-30<br/>Publisher name: IEEE
Source: researchoutputwizard
Source-ID: 1348
Research output: Scientific › peer-review › Conference contribution

Ultrasmall microdisk and microring lasers based on InAs/InGaAs/GaAs quantum dots

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, St. Petersburg State Polytechnical University, St. Petersburg Academic University, ITMO University, University of Eastern Finland
Nanofabrication and Adsorption Studies of Organic Molecules on Metal and Metal Alloy Surfaces as Templates for Biofunctional Applications

The nanofabrication of organic layers on metal and metal alloy surfaces was studied in this thesis by employing photoelectron spectroscopy (PES) as the main analysis method. The motivation for this research is to introduce new properties to metal and metal alloy surfaces via self-assembly driven adsorption processes of organic molecules. Trimesic acid (TMA) and glycine adsorption on single crystal Cu(100) surface was investigated with PES and scanning tunnelling microscopy (STM). TMA on Cu(100) exhibits coverage dependent surface phases with drastic changes in the molecular orientation. The mobile TMA molecules at low coverage transform into Cu atom coordinated TMA networks and finally into carboxyl (COOH) functionalized, densely packed TMA monolayers. This is enabled due to three equivalent COOH groups symmetrically around a rigid benzene ring. Homo- and heterochiral surface phases of achiral glycine on Cu(100) were observed, and a new structural model for glycine bonding on Cu(100) based on STM and density functional theory calculations is presented. The coadsorption of aminopropyl trimethoxysilane (APS) and mercaptopropyl trimethoxysilane (MPS) on stainless steel was studied with an aim to incorporate MPS in APS matrix with tuneable distribution. In addition to the determination of elemental and chemical states at the surface, PES data was also used to determine the surface morphology by employing inelastic electron energy-loss background analysis. Synchrotron radiation mediated PES enabled the study of the in-depth distribution of the chemical states in non-destructive manner. The functionality of the APS/MPS overlayers on stainless steel was studied with chemical derivatization. The studies of TMA and glycine on Cu(100) provide important knowledge of the adsorption behaviour of small molecules on surfaces, which is crucial for understanding the adsorption phenomena of larger molecules, such as proteins on more complex substrates. The fabricated surface structures may also be applicable to molecular electronics or catalytic surfaces. The bifunctional APS/MPS nanomolecular layer on stainless steel works as a template, to which biomolecules can be covalently coupled with tuneable distribution. Hence, the stainless steel surface can be biofunctionalized for a range of applications, depending on the properties of the biomolecules.
A 1.33 μm picosecond pulse generator based on semiconductor disk mode-locked laser and bismuth fiber amplifier

We demonstrate that a combination of ultrafast wafer bonded semiconductor disk laser and a bismuth-doped fiber amplifier provides an attractive design for high power 1.33 μm tandem hybrid systems. Over 0.5 W of average output power was achieved at a repetition rate of 827 MHz that corresponds to a pulse energy of 0.62 nJ. (C) 2014 Optical Society of America
Composition dependent growth dynamics in molecular beam epitaxy of GaInNAs solar cells

We have investigated the role of the nitrogen content, the growth parameters, and the annealing processes involved in molecular beam epitaxy of GaInNAs solar cells lattice-matched to GaAs. The nitrogen composition was varied between 1% and 5%. The influence of the growth temperature was assessed by performing photoluminescence, atomic force microscopy, X-ray diffraction, reflection high-energy electron diffraction, quantum efficiency and light-biased current-voltage measurements. The growth temperature ensuring the best cell parameters was found to be 440 °C. At this temperature we were able to incorporate up to 4% of nitrogen and achieve a good material quality. Further increase of the N composition to 5% led to phase separation. For the lattice matched samples grown within the optimal temperature range, we have identified a clear (1×3) surface reconstruction. Using the optimized growth we have demonstrated a GaInNAs p-i-n solar cell structure containing 4% nitrogen, that exhibited a short-circuit current density as high as 33.8 mA/cm² in respect to effective area illuminated. These measurements have been performed under real sun AM1.5 (~1000 W/m²) illumination. © 2014 Elsevier B.V.
Site-Controlled Epitaxy and Fundamental Properties of InAs Quantum Dot Chains

Self-assembled InAs/GaAs quantum dots (QD) are artificial atoms which exhibit extremely high optical and structural quality and enable tailoring of the quantum confinement by adjusting their size, shape, and chemical composition. However, a disadvantage of the self-assembled formation process is that the QDs are randomly located on the GaAs surface. The ability to determine the positions of the QDs at the moment of nucleation, i.e. site-controlled growth, is essential for the new generation of photonic applications including single- and entangled-photon sources and nanophotonic integrated circuits. The purpose of this thesis is to introduce a new nanomaterial system composed of site-controlled InAs quantum dot chains (QDC) grown by molecular beam epitaxy in nanoimprint lithography prepared grooves. A thorough investigation of the structural and optical properties of QDCs is also presented. The thesis demonstrates that, regardless of the inherent anisotropy of the GaAs(100) surface, QDCs having similar density, size, and emission energy can be grown simultaneously on nanopatterns with different orientations by carefully selecting the growth parameters. However, the in-plane optical polarization of the spontaneous emission from the QDCs depends on their orientation. In more general perspective, this thesis reveals that the nanopattern on which the site-controlled QDs are grown has a strong influence on their morphological properties, including shape, size, strain profile, and composition profile. These properties are strongly cross-correlated and they all influence the electronic and optical characteristics of the QDs. For example, the growth of QDs in the grooves increases their oscillator strength for the vertically polarized spontaneous emission, which is the polarization component that can be coupled to surface plasmons in a metal film. This polarization property accompanied by the possibility of deterministic lateral positioning makes the site-controlled QDCs potential building blocks for plasmonic and nanophotonic waveguides.
1.33 um MOPA system based on ultrafast semiconductor disk laser and bismuth fiber amplifier

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Heikkinen, J., Gumenyuk, R., Rantamäki, A., Leinonen, T., Melkumov, M., Dianov, E. M., Okhotnikov, O. G.
Number of pages: 1
Pages: 32-32
Publication date: 2014

Host publication information
Title of host publication: Optics and Photonics Days 2014, OPD2014 Proceedings, 20-22 May, 2014, Turku, Finland
Publisher: Finnish Optical Society
ISBN (Print): 978-952-12-3055-4

Publication series
Name: Optics and Photonics Days

Bibliographical note
Oral, Session 6.Ultrafast optics and microscopy
Contribution: organisation=orc,FACT1=1
Portfolio EDEND: 2014-10-24
Publisher name: Finnish Optical Society
Source: researchoutputwizard
Source-ID: 430
Research output: Scientific » Conference contribution

Abrasion and compression resistance of liquid-flame-spray-deposited functional nanoparticle coatings on paper

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging, Department of Physics, Research area: Aerosol Physics, Research group: Aerosol Synthesis, Engineering materials science and solutions (EMASS), Abo Akad Univ, Abo Akademi University, Dept Phys, Paper and Fibre Research Institute (PFI), SP Technical Research Institute of Sweden
Authors: Stepien, M., Chinga-Carrasco, G., Saarinen, J. J., Teisala, H., Tuominen, M., Haapanen, J., Kuusipalo, J., Mäkelä, J. M., Toivakka, M.
Number of pages: 15
Pages: 68-82
Publication date: 2014

Host publication information
Title of host publication: 13th TAPPI Advanced Coating Fundamentals Symposium 2014
Publisher: TAPPI Press
ISBN (Print): 9781510801295
ASJC Scopus subject areas: Materials Chemistry, Electrical and Electronic Engineering
Links:
http://www.scopus.com/inward/record.url?scp=84942588921&partnerID=8YFLogxK (Link to publication in Scopus)

Bibliographical note
ORG=mol,0.5
ORG=fys,0.5
Source: Scopus
Source-ID: 84942588921
Aerosol fabrication of multilayer nanocomposites for nonlinear optics

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics, Department of Materials Science, Research group: Materials Characterization, Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research area: Optics, Research group: Nonlinear Optics, Research group: Nonlinear Fiber Optics, Research group: Aerosol Synthesis, Center of Microscopy and Nanotechnology, University of Oulu, P.O. Box 7150, FI-90014, Finland
Publication date: 2014

Host publication information

Bibliographical note
Kysytty ISBN tai ISSN-numeroa, ei löydy

Aerosol fabrication of silver–silica nanocomposites for linear and nonlinear optics

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Publication date: 2014

Host publication information
Title of host publication: NOSA 2014, Nordic Aerosol Symposium, January 30-31, 2014, Stockholm, Sweden
Publisher: Nordic Society for Aerosol Research

Bibliographical note
ISBN kysytty, HO.

Aerosol synthesis of silver-silica nanocomposites for second-order nonlinear optics

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Physics, Research area: Aerosol Physics, Department of Materials Science, Research group: Materials Characterization, Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research area: Optics, Research group: Nonlinear Optics, Research group: Nonlinear Fiber Optics, Research group: Aerosol Synthesis, Center of Microscopy and Nanotechnology, University of Oulu, P.O. Box 7150, FI-90014, Finland
Publication date: 2014

Host publication information
Title of host publication: Aerosol Technology 2014, June 16-18, 2014, Karlsruhe, Germany
Anodic Oxidation of Ultra-Thin Ti Layers on ITO Substrates and their Application in Organic Electronic Memory Elements

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Surface Science, Augmented Human Activities (AHA), Frontier Photonics
Authors: Heljo, P., Wolff, K., Lahtonen, K., Valden, M., Berger, P., Majumdar, H., Lupo, D.
Number of pages: 8
Pages: 91-98
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Electrochimica Acta
Volume: 137
Issue number: 10
ISSN (Print): 0013-4686
Ratings:
Scopus rating (2016): SJR 1.357 SNIP 1.167 CiteScore 4.74
Scopus rating (2015): SJR 1.349 SNIP 1.344 CiteScore 4.86
Scopus rating (2014): SJR 1.391 SNIP 1.482 CiteScore 4.59
Scopus rating (2013): SJR 1.435 SNIP 1.607 CiteScore 4.44
Scopus rating (2012): SJR 1.651 SNIP 1.592 CiteScore 3.99
Scopus rating (2011): SJR 1.621 SNIP 1.803 CiteScore 4.15
Scopus rating (2010): SJR 1.691 SNIP 1.725
Scopus rating (2009): SJR 1.536 SNIP 1.625
Scopus rating (2008): SJR 1.533 SNIP 1.47
Scopus rating (2007): SJR 1.563 SNIP 1.595
Scopus rating (2006): SJR 1.534 SNIP 1.736
Scopus rating (2005): SJR 1.481 SNIP 1.533
Scopus rating (2004): SJR 1.365 SNIP 1.581
Scopus rating (2003): SJR 1.628 SNIP 1.526
Scopus rating (2002): SJR 1.644 SNIP 1.459
Scopus rating (2001): SJR 1.319 SNIP 1.408
Scopus rating (2000): SJR 1.009 SNIP 1.168
Scopus rating (1999): SJR 0.989 SNIP 1.192
Original language: English
DOIs:
10.1016/j.electacta.2014.05.157

Applications of supercritical carbon dioxide in materials processing and synthesis

General information
State: Published
Ministry of Education publication type: A2 Review article in a scientific journal
Organisations: Department of Materials Science, Engineering materials science and solutions (EMASS)
Authors: Zhang, X., Heinonen, S., Levänen, E.
Cavity-enhanced single photon emission from site-controlled In(Ga)As quantum dots fabricated using nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Tomilla, J., Belykh, V., Hakkarainen, T. V., Heinonen, E., Sibeldin, N., Schramm, A., Guina, M.
Number of pages: 4
Pages: 1-4
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: APPLIED PHYSICS LETTERS
Volume: 104
Article number: 213104
ISSN (Print): 0003-6951
Ratings:
Scopus rating (2016): CiteScore 2.67 SJR 1.132 SNIP 0.996
Scopus rating (2015): SJR 1.085 SNIP 0.983 CiteScore 2.47
Scopus rating (2014): SJR 1.799 SNIP 1.462 CiteScore 3.25
Scopus rating (2013): SJR 2.149 SNIP 1.652 CiteScore 3.77
Scopus rating (2012): SJR 2.554 SNIP 1.754 CiteScore 3.76
Scopus rating (2011): SJR 2.805 SNIP 1.94 CiteScore 4.04
Scopus rating (2010): SJR 2.926 SNIP 1.789
Scopus rating (2009): SJR 2.857 SNIP 1.848
Scopus rating (2008): SJR 2.934 SNIP 1.83
Scopus rating (2007): SJR 3.039 SNIP 1.913
Scopus rating (2006): SJR 3.457 SNIP 2.288
Scopus rating (2005): SJR 3.709 SNIP 2.382
Scopus rating (2004): SJR 3.904 SNIP 2.38
Scopus rating (2003): SJR 3.765 SNIP 2.27
Scopus rating (2002): SJR 3.917 SNIP 2.365
Scopus rating (2001): SJR 4.111 SNIP 2.212
Scopus rating (2000): SJR 4.277 SNIP 2.013
Scopus rating (1999): SJR 4.35 SNIP 2.11
Original language: English
DOI: 10.1063/1.4879845
Controlling the synergetic effects in (3-aminopropyl) trimethoxysilane and (3-mercaptopropyl) trimethoxysilane coadsorption on stainless steel surfaces

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Surface Science, Frontier Photonics
Number of pages: 11
Pages: 856-866
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Applied Surface Science
Volume: 317
ISSN (Print): 0169-4332
Ratings:
Scopus rating (2016): SJR 0.951 SNIP 1.225 CiteScore 3.37
Scopus rating (2015): SJR 0.914 SNIP 1.3 CiteScore 3.13
Scopus rating (2014): SJR 0.958 SNIP 1.477 CiteScore 2.96
Scopus rating (2013): SJR 0.965 SNIP 1.488 CiteScore 2.78
Scopus rating (2012): SJR 0.918 SNIP 1.373 CiteScore 2.26
Scopus rating (2011): SJR 0.908 SNIP 1.402 CiteScore 2.27
Scopus rating (2010): SJR 0.924 SNIP 1.141
Scopus rating (2009): SJR 0.842 SNIP 1.023
Scopus rating (2008): SJR 0.899 SNIP 1.087
Scopus rating (2007): SJR 0.795 SNIP 0.945
Scopus rating (2006): SJR 0.852 SNIP 1.052
Scopus rating (2005): SJR 0.679 SNIP 0.946
Scopus rating (2004): SJR 0.964 SNIP 1.126
Scopus rating (2003): SJR 0.988 SNIP 1.027
Scopus rating (2002): SJR 0.921 SNIP 0.954
Scopus rating (2001): SJR 0.841 SNIP 0.796
Scopus rating (2000): SJR 0.866 SNIP 0.772
Scopus rating (1999): SJR 1.064 SNIP 0.907
Original language: English
DOIs:
10.1016/j.apsusc.2014.08.199

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-31<br/>Publisher name: Elsevier
Source: researchoutputwizard
Source-ID: 1772
Research output: Scientific - peer-review › Article

Control of emitted light polarization in a 1310nm dilute nitride spin-vertical cavity surface emitting laser subject to circularly polarized optical injection

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Alharti, A., Hurtado, A., Al Seyab, R., Korpjärvi, V., Guina, M., Henning, I., Adams, M.
Number of pages: 5
Pages: 1-5
Publication date: 2014
Deep levels in 1 eV bandgap dilute nitride antimonide solar cells

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Polojärvi, V., Tukiainen, A., Aho, A., Raappana, M., Aho, T., Schramm, A., Guina, M.
Number of pages: 3
Pages: 1-3
Publication date: 2014

Host publication information
Title of host publication: Proceedings of the 29th European Photovoltaic Solar Energy Conference and Exhibition, EU PVSEC 2014, September 22-26, 2014, Amsterdam, the Netherlands
Publisher: European Environment Agency
ISBN (Print): 3-936338-34-5

Publication series
Name: European photovoltaic solar energy conference
Links:

Bibliographical note

**Determination of the functionality of monolayers of aminopropyl trimethoxy silane and mercaptopropyl trimethoxy silane on stainless steel with SR-PES and chemical derivatization**

**General information**
State: Published  
Ministry of Education publication type: B2 Part of a book or another research book  
Organisations: Optoelectronics Research Centre, Research group: Surface Science  
Authors: Vuori, L., Hannula, M., Hirsimäki, M., Tönisoo, A., Nömmiste, E., Valden, M.  
Number of pages: 2  
Pages: 1-2  
Publication date: 2014

**Host publication information**
Place of publication: Lund, Sweden  
Publisher: MAX-LAB  
Links:  
https://www.maxlab.lu.se/node/1913

**Bibliographical note**
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-15  
Source: researchoutputwizard  
Source-ID: 1771  
Research output: Scientific › Chapter

**Dilute Nitride Space Solar Cells: Towards 4 Junctions**

**General information**
State: Published  
Ministry of Education publication type: A4 Article in a conference publication  
Organisations: Optoelectronics Research Centre  
Authors: Aho, A., Tukiainen, A., Polojärvi, V., Guina, M.  
Number of pages: 3  
Pages: 1-3  
Publication date: 2014

**Host publication information**
Title of host publication: 10th European Space Power Conference ESPC 2014, 13-17 April, 2014, Noordwijkherout, the Netherlands  
Publisher: European Space Agency  
ISBN (Print): 978-92-9221-283-4

**Publication series**  
Name: European Space Agency - Special Publication (ESA - SP)  
Volume: 719  
ISSN (Print): 1609-042X

**Bibliographical note**  
ESA SP-719  
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-09-18<br/>Publisher name: European Space Agency  
Source: researchoutputwizard  
Source-ID: 60  
Research output: Scientific › peer-review › Conference contribution

**Effect of plasma treated Ag/indium tin oxide anode modification on stability of polymer solar cells**

**General information**
High performance wafer-fused semiconductor disk lasers emitting in the 1300 nm waveband

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Number of pages: 6
Pages: 29398-29403
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 22
Issue number: 24
ISSN (Print): 1094-4087

Ratings:
High power cavity-adjusted semiconductor disc lasers emitting in the 1310 nm waveband

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Frontier Photonics
Authors: Sirbu, A., Rantamäki, A., Iakovlev, V., Mereuta, A., Lyytikäinen, J., Caliman, A., Okhotnikov, O., Kapon, E.
Number of pages: 2
Publication date: 2014

Host publication information
Title of host publication: ISLC 2014, IEEE 24th International Semiconductor Laser Conference, 7 - 10 September, 2014, Mallorca, Spain
Publisher: IEEE
ISBN (Print): 978-1-4799-5721-7

Publication series
Name: IEEE International Semiconductor Laser Conference
DOIs: 10.1109/ISLC.2014.231

Bibliographical note
Oral WA6<br/>Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-09-24<br/>Publisher name: IEEE
Source: researchoutputwizard
Source-ID: 1519
Research output: Scientific - peer-review › Conference contribution

High-power flip-chip semiconductor disk laser in the 1.3. um wavelength band

General information
State: Published
High power semiconductor disk laser with a semiconductor-dielectric-metal compound mirror

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Saarinen, E. J., Lyytikäinen, J., Lahtonen, K., Valden, M., Okhotnikov, O. G.
Number of pages: 4
Pages: 4855-4858
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Optics Letters
Volume: 39
Issue number: 16
ISSN (Print): 0146-9592
Ratings:
Scopus rating (2016): SJR 1.864 SNIP 1.658 CiteScore 3.54
Scopus rating (2015): SJR 2.142 SNIP 1.642 CiteScore 3.53
Scopus rating (2014): SJR 2.497 SNIP 2.056 CiteScore 3.86
Scopus rating (2013): SJR 2.458 SNIP 2.095 CiteScore 3.95
Scopus rating (2012): SJR 2.596 SNIP 1.95 CiteScore 3.52
Scopus rating (2011): SJR 2.518 SNIP 2.475 CiteScore 3.69
Scopus rating (2010): SJR 2.669 SNIP 2.293
Scopus rating (2009): SJR 3.167 SNIP 2.665
Scopus rating (2008): SJR 3.521 SNIP 2.718
Scopus rating (2007): SJR 3.706 SNIP 2.573
Scopus rating (2006): SJR 3.914 SNIP 2.39
Scopus rating (2005): SJR 4.044 SNIP 1.699
Original language: English
DOIs: 10.1364/OL.39.004855

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-08-31<br/>Publisher name: Optical Society of America
Source: researchoutputwizard
Source-ID: 1351
Research output: Scientific - peer-review › Article
High Power Wafer-Fused Flip Chip Semiconductor Disk Laser at 1.27 μm

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, École Polytechnique Fédérale de Lausanne, Laboratory of Physics of Nanostructures, CH-1015 Lausanne, Switzerland
Authors: Rantamäki, A., Sirbu, A., Saarinen, E., Lyytikäinen, J., Iakolev, V., Kapon, E., Okhotnikov, O.
Publication date: 2014

Host publication information
Title of host publication: 6th EPS-QEOD Euro photon Conference, 24-29 August, 2014, Neuchâtel, Switzerland.
Conference Digest: Europhysics Conference Abstract Volume 38 E
ISBN (Print): 2-914771-89-4
Research output: Scientific - peer-review › Conference contribution

Hybrid systems of AlInP microdisks and colloidal CdSe nanocrystals showing whispering-gallery modes at room temperature

We report on the realization of hybrid systems composed of passive optical microdisk resonators prepared from epitaxial layer systems and nanocrystal quantum emitters synthesized by colloidal chemistry. The AlInP disk material allows for the operation in the visible range, as probed by CdSe-based nanocrystals. Photoluminescence spectra at room temperature reveal sets of whispering-gallery modes consistent with finite-difference time-domain simulations. In the experiments, a special sample geometry renders it possible to detect resonant optical modes perpendicular to the disk plane.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Tampere University of Technology, Augmented Human Activities (AHA), Frontier Photonics, Institute of Physical Chemistry, University of Hamburg
Improving the effect of nanoscale barrier coating on BOPP film properties: Influence of substrate contamination, web handling and pretreatments

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Materials Science, Research group: Paper Converting and Packaging, Engineering materials science and solutions (EMASS)
Authors: Lahti, J., Johansson, P., Lahtinen, K., Cameron, D. C., Seppänen, T.
Number of pages: 23
Pages: 1039-1061
Publication date: 2014

Host publication information
Title of host publication: TAPPI PLACE Conference 2014
Volume: 2
Publisher: TAPPI Press
ISBN (Print): 9781510801271
ASJC Scopus subject areas: Materials Science(all), Chemistry(all), Mechanical Engineering, Media Technology, Chemical Engineering(all)
Incorporation model of N into GaInNAs alloys grown by radio-frequency plasma-assisted molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Aho, A., Korpijärvi, V., Tukiainen, A., Puustinen, J., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Physics
Volume: 116
Article number: 213101
ISSN (Print): 0021-8979
Ratings:
Scopus rating (2016): CiteScore 1.72 SJR 0.632 SNIP 0.815
Scopus rating (2015): SJR 0.618 SNIP 0.84 CiteScore 1.57
Scopus rating (2014): SJR 1.005 SNIP 1.18 CiteScore 2.04
Scopus rating (2013): SJR 1.165 SNIP 1.317 CiteScore 2.24
Scopus rating (2012): SJR 1.305 SNIP 1.294 CiteScore 2.13
Scopus rating (2011): SJR 1.373 SNIP 1.318 CiteScore 2.24
Scopus rating (2010): SJR 1.47 SNIP 1.195
Scopus rating (2009): SJR 1.518 SNIP 1.238
Scopus rating (2008): SJR 1.667 SNIP 1.338
Scopus rating (2007): SJR 1.708 SNIP 1.395
Scopus rating (2006): SJR 1.947 SNIP 1.649
Scopus rating (2005): SJR 2.034 SNIP 1.627
Scopus rating (2004): SJR 2.097 SNIP 1.602
Scopus rating (2003): SJR 2.019 SNIP 1.525
Scopus rating (2002): SJR 2.225 SNIP 1.674
Scopus rating (2001): SJR 2.079 SNIP 1.554
Scopus rating (2000): SJR 2.338 SNIP 1.543
Scopus rating (1999): SJR 2.071 SNIP 1.517
Original language: English
DOIs:
10.1063/1.4903318

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-31<br/>Publisher name: American Institute of Physics
Source: researchoutputwizard
Source-ID: 57
Research output: Scientific - peer-review › Article

Influence of surface hydroxylation on the oxidation of FeCr in O2 and air

General information
State: Published
Ministry of Education publication type: B2 Part of a book or another research book
Organisations: Optoelectronics Research Centre, Research group: Surface Science
Authors: Hirsimäki, M., Hannula, M., Lahtonen, K., Urpelainen, S., Valden, M.
Modeling of MBE-Grown GaInNAs Solar Cells

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Tukiainen, A., Aho, A., Polojärvi, V., Guina, M.
Number of pages: 4
Pages: 1-4
Publication date: 2014

Host publication information
Title of host publication: Max-Lab Activity Report 2013. Reports 2013 Synchrotron Radiation. Beamline I511-1
Place of publication: Lund, Sweden
Publisher: MAX-LAB
Links:
https://www.maxlab.lu.se/node/1913

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-15
Source: researchoutputwizard
Source-ID: 480
Research output: Scientific › Chapter

Moth eye antireflection coated GaInP/GaAs/GaInNAs solar cell

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Aho, A., Tommila, J., Tukiainen, A., Polojärvi, V., Niemi, T., Guina, M.
Number of pages: 4
Pages: 33-36
Publication date: 2014

Host publication information
Title of host publication: 10th European Space Power Conference ESPC 2014, 13-17 April, 2014, Noordwijkerhout, the Netherlands
Publisher: European Space Agency
ISBN (Print): 978-92-9221-283-4

Publication series
Name: European Space Agency - Special Publication (ESA - SP)
Volume: 719
ISSN (Print): 1609-042X
Links:
http://www.espc2014.com/

Bibliographical note
ESA SP-719<br/>Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-12-31<br/>Publisher name: European Space Agency
Source: researchoutputwizard
Source-ID: 1646
Research output: Scientific - peer-review › Conference contribution

Publication series
Optical gain in 1.3 μm electrically-driven dilute nitride VCSOAs

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Lisevdin, S. B., Khan, N. A., Mazzucato, S., Balkan, N., Adams, M. J., Korpijärvi, V., Guina, M., Mezosi, G., Sorel, M.
Number of pages: 5
Pages: 1-5
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 9
Article number: 22
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Scopus rating (2008): SJR 0.828 SNIP 0.632
Scopus rating (2007): SJR 1.458 SNIP 0.71
Original language: English
DOIs:

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: American Institute of Physics
Source: researchoutputwizard
Source-ID: 59
Research output: Scientific - peer-review › Conference contribution

Performance assessment of multijunction solar cells incorporating GainNASb

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Aho, A., Tukiainen, A., Polojärvi, V., Guina, M.
Number of pages: 7
Pages: 1-7

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: SpringerOpen
Source: researchoutputwizard
Source-ID: 956
Research output: Scientific - peer-review › Article
Rubber Nanocomposites

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Department of Materials Science, Research group: Plastics and Elastomer Technology
Authors: Das, A., Basu, D., Heinrich, G.
Number of pages: 5
Pages: 1-5
Publication date: 2014

Host publication Information
Title of host publication: Encyclopedia of Polymeric Nanomaterials
Place of publication: Berlin, Heidelberg
Publisher: Springer
Editors: Kobayashi, S., Müllen, K.
ISBN (Print): 978-3-642-36199-9
DOIs: 10.1007/978-3-642-36199-9_306-1
Source: Bibtex
Source-ID: urn:93b2051c50ea63b4fc5eeac4af66ef03
Research output: Scientific - peer-review › Article

Semiconductor disk laser with a semiconductor dielectric-metal mirror

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Research group: Surface Science, Frontier Photonics
Authors: Rantamäki, A., Saarinen, E. J., Lyytikäinen, J., Lahtonen, K., Valden, M., Okhotnikov, O. G.
Number of pages: 1
Pages: 1-1
Host publication Information
Title of host publication: 16th International Conference on Laser Optics 2014, June 30 - July 4, 2014, St. Petersburg, Russia
Publisher: IEEE
ISBN (Print): 978-1-4799-3884-1
ISBN (Electronic): 978-1-4799-3885-8

Publication series
Name: International Conference on Laser Optics
DOIs:
10.1109/LO.2014.6886292

Bibliographical note
Talk TuR3-16<br/>Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-09-30<br/>Publisher name: IEEE
Source: researchoutputwizard
Source-ID: 1350
Research output: Scientific › peer-review › Conference contribution

Single site-controlled quantum dot in micropillar cavity

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Hakkarainen, T. V., Tommila, J., Belykh, V., Heinonen, E., Schramm, A., Guina, M.
Number of pages: 1
Pages: 17-17
Publication date: 2014

Host publication Information
Title of host publication: Optics and Photonics Days 2014, OPD2014 Proceedings, 20-22 May, 2014, Turku, Finland
Publisher: Finnish Optical Society
ISBN (Print): 978-952-12-3055-4

Publication series
Name: Optics and Photonics Days

Bibliographical note
Oral, Session 3, Integrated optics<br/>Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2014-10-24<br/>Publisher name: Finnish Optical Society
Source: researchoutputwizard
Source-ID: 393
Research output: Scientific › Conference contribution

Surface-enhanced Raman Scattering Active Substrates by Liquid Flame Spray Deposited and Inkjet Printed Silver Nanoparticles

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Optoelectronics Research Centre, Engineering materials science and solutions (EMASS), Frontier Photonics
Authors: Saarinen, J. J., Valtakari, D., Haapanen, J., Salminen, T., Mäkelä, J. M., Uozumi, J.
Number of pages: 6
Pages: 339-344
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Optical Review
Volume: 21
Issue number: 3
ISSN (Print): 1340-6000
Ratings:
Scopus rating (2016): SJR 0.347 SNIP 0.651 CiteScore 0.71
Scopus rating (2015): SJR 0.281 SNIP 0.667 CiteScore 0.6
Scopus rating (2014): SJR 0.371 SNIP 0.859 CiteScore 0.75
Scopus rating (2013): SJR 0.393 SNIP 1.009 CiteScore 0.77
Scopus rating (2012): SJR 0.416 SNIP 0.692 CiteScore 0.73
Scopus rating (2011): SJR 0.442 SNIP 1.05 CiteScore 0.82
Scopus rating (2010): SJR 0.345 SNIP 0.78
Scopus rating (2009): SJR 0.354 SNIP 0.847
Scopus rating (2008): SJR 0.491 SNIP 0.542
Scopus rating (2007): SJR 0.441 SNIP 0.717
Scopus rating (2006): SJR 0.302 SNIP 0.651
Scopus rating (2005): SJR 0.345 SNIP 0.697
Scopus rating (2004): SJR 0.388 SNIP 0.657
Scopus rating (2003): SJR 0.432 SNIP 0.854
Scopus rating (2002): SJR 0.578 SNIP 0.786
Scopus rating (2001): SJR 0.582 SNIP 0.907
Scopus rating (2000): SJR 0.467 SNIP 0.52
Scopus rating (1999): SJR 0.867 SNIP 0.369
Original language: English
DOIs:
10.1007/s10043-014-0051-8

Bibliographical note
Contribution: organisation=fys,FACT1=0.5<br/>Contribution: organisation=orc,FACT2=0.5<br/>Portfolio EDEND: 2014-06-19<br/>Publisher name: Optical Society of Japan
Source: researchoutputwizard
Source-ID: 1423
Research output: Scientific - peer-review › Article

Surface Modifications and Analysis Methods at Molecular Level

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Surface Science, Department of Physics, Research group: Ultrafast and intense lasers, Research group: Nanophotonics
Publication date: 2014

Host publication information
Title of host publication: Abstracts of the 28th International Conference on Surface Modification Technologies, SMT28, Tampere University of Technology, Tampere, Finland, June 16-18, 2014
Place of publication: Tampere
Publisher: Tampere University of Technology
Links:

Bibliographical note
xabstract
Research output: Scientific - peer-review › Conference contribution

Wafer-fused VECSELs emitting in the 1310nm waveband

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Wafer fused, wavelength controlled 1300 nm vertical external cavity surface emitting lasers

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, École Polytechnique Fédérale de Lausanne, Laboratory of Physics of Nanostructures, CH-1015 Lausanne, Switzerland
Publication date: 2014

Host publication information
Publisher: SPIE
ISBN (Print): 978-0-8194-9879-3

Publication series
Name: SPIE Conference Proceedings
Volume: 8966
ISSN (Print): 0277-786X
DOIs: 10.1117/12.2039692

Bibliographical note
Invited Paper<br>Contribution: organisation=orc,FACT1=1<br>Portfolio EDEND: 2014-04-29<br>Publisher name: SPIE - International Society for Optical Engineering
Source: researchoutputwizard
Source-ID: 1518
Research output: Scientific - peer-review › Conference contribution

Single KTP nanocrystals as second-harmonic generation biolabels in cortical neurons

We report an efficient colloidal synthesis of KTiOPO4 (KTP) nanocrystals with excellent crystallinity and the direct observation of optical second-harmonic generation (SHG) from discrete KTP nanocrystals in neurons cultured from mammalian brain cortex. Direct internalization and monitoring of these nanoparticles was successfully achieved without limitations from cytotoxicity, bleaching and blinking emission.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Optics, Research group: Nonlinear Optics, Frontier Photonics, Univ Paris 06, Centre National de la Recherche Scientifique (CNRS), Pierre & Marie Curie University - Paris 6, Institut de Recherche pour le Developpement (IRD), Inria, Institut National de la Sante et de la Recherche Medicale (Inserm), Univ Sorbonne, CNRS,ICM,UMR S 1127,UMR 7225,U1127, INSERM,Inria Paris Rocquencourt,Inst Cerveau & Mo, CNRS, Centre National de la Recherche Scientifique (CNRS), Universite de Bordeaux - PRES, Lab Bordelais Rech Informat, PICTURA Res Grp, UMR 5800, LAAS/CNRS, Laboratoire de Physique de la Matière Condensée-Ecole Polytechnique-CNRS, UMR 7643, Laboratoire de Photonique Quantique et Moléculaire-ENS Cachan, UMR 8537, CNRS Centre National de la Recherche Scientifique, Laboratoire Aimé Cotton, Université Paris-Sud and ENS Cachan, CEA/CNG, Laboratoire Génomique Fonctionnelle, INSERM 894, Centre Psychiatrie et Neurosciences de l'Inserm
Number of pages: 6
1.56 μm 1 watt single frequency semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Rautiainen, J., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O. G.
Number of pages: 6
Pages: 2355-2360
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 21
Issue number: 2
ISSN (Print): 1094-4087
Ratings:
Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
Scopus rating (2003): SJR 2.688 SNIP 2.193
Scopus rating (2002): SJR 1.547 SNIP 1.673
1 Watt from 1.56 µm Single Frequency Semiconductor Disk Laser

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Rantamäki, A., Rautiainen, J., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O. G.
Number of pages: 1
Pages: 1-1
Publication date: 2013

Host publication information
Title of host publication: 2013 Conference on Lasers and Electro-Optics Europe and International Quantum Electronics Conference, CLEO/EUROPE - IQEC 2013, 12-16 May 2013, Munich, Germany
Place of publication: Piscataway, NJ
Publisher: IEEE

Publication series
Name: European Conference on Lasers and Electro-Optics and the International Quantum Electronics Conference

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2013-09-29<br/>Publisher name: IEEE
Source-ID: 3226
Research output: Scientific - peer-review › Conference contribution

Actively Mode-Locked Semiconductor Disk Laser Using Vertical Cavity Modulator

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rautiainen, J., Rantamäki, A., Tavast, M., Okhotnikov, O. G.
Number of pages: 1
Publication date: 2013

Host publication information
Title of host publication: 2013 Conference on Lasers and Electro-Optics Europe and International Quantum Electronics Conference, CLEO/EUROPE - IQEC 2013, 12-16 May 2013, Munich, Germany
Place of publication: Piscataway, NJ
Publisher: IEEE

Publication series
Name: European Conference on Lasers and Electro-Optics and the International Quantum Electronics Conference

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2013-09-29<br/>Publisher name: IEEE
Source: researchoutputwizard
Coating of gold nanoparticles made by pulsed laser ablation in liquids with silica shells by simultaneous chemical synthesis

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Materials Science, Optoelectronics Research Centre, Engineering materials science and solutions (EMASS), Frontier Photonics
Authors: Salminen, T., Honkanen, M., Niemi, T.
Pages: 3047-3051
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Physical Chemistry Chemical Physics
Volume: 15
Issue number: 9
ISSN (Print): 1463-9076
Ratings:
Scopus rating (2016): CiteScore 4.06 SJR 1.678 SNIP 1.117
Scopus rating (2015): SJR 1.771 SNIP 1.244 CiteScore 4.45
Scopus rating (2014): SJR 1.772 SNIP 1.253 CiteScore 4.29
Scopus rating (2013): SJR 1.715 SNIP 1.216 CiteScore 4.05
Scopus rating (2012): SJR 1.916 SNIP 1.184 CiteScore 3.67
Scopus rating (2011): SJR 1.697 SNIP 1.203 CiteScore 3.6
Scopus rating (2010): SJR 1.802 SNIP 1.196
Scopus rating (2009): SJR 2.127 SNIP 1.369
Scopus rating (2008): SJR 2.158 SNIP 1.211
Scopus rating (2007): SJR 1.84 SNIP 1.138
Scopus rating (2006): SJR 1.467 SNIP 1.128
Scopus rating (2005): SJR 1.389 SNIP 1.104
Scopus rating (2004): SJR 1.173 SNIP 1.007
Scopus rating (2003): SJR 1.093 SNIP 0.925
Scopus rating (2002): SJR 1.122 SNIP 0.973
Scopus rating (2001): SJR 1.09 SNIP 0.914
Scopus rating (2000): SJR 0.948 SNIP 1.068
Scopus rating (1999): SJR 0.121 SNIP 0
Original language: English
DOIs:
10.1039/c2cp42999c

Bibliographical note
First published on the web 25 Sep 2012
Contribution: organisation=orc,FACT1=1
Contribution: organisation=mol,FACT2=0
Publisher name: RSC Publishing
Source: researchoutputwizard
Source-ID: 3348
Research output: Scientific - peer-review » Article

Effects of 7-MeV electron irradiation on photoluminescence from 1-eV GaInNAs-on-GaAs epilayers

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Pavelescu, E., Kudrawiec, R., Puustinen, J., Tukiainen, A., Guina, M.
Number of pages: 4
Pages: 347-350
High current generation in dilute nitride solar cells grown by molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Aho, A., Tukiainen, A., Polojärvi, V., Salmi, J., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2013

Host publication information
Title of host publication: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices II. SPIE Photonic West O PTO 2013, Feb 2-7, 2013, San Fransisco, CA, U.S.A.
Place of publication: Bellingham, WA
Publisher: SPIE
Article number: 8620-55
ISBN (Print): 978-0-8194-9389-7

Publication series
Name: SPIE Conference Proceedings
Volume: 8620
No.: 55
ISSN (Print): 0277-786X
DOIs:
10.1117/12.2002972

Bibliographical note
Contribution: organisation=orc,FACT1=1
Portfolio EDEND: 2013-07-29
Publisher name: SPIE
Source-ID: 1884
Research output: Scientific - peer-review > Conference contribution

High power semiconductor disk lasers for 1.3-1.6 µm and 650-800 nm spectral ranges

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, École Polytechnique Fédérale de Lausanne, Laboratory of Physics of Nanostructures, CH-1015 Lausanne, Switzerland
Authors: Rantamäki, A., Rautiainen, J. T., Lyytikäinen, J., Heikkinen, J. J., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O.
Impact of the non-planar morphology of pre-patterned substrates on the structural and electronic properties of embedded site-controlled InAs quantum dots

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Hakkarainen, T. V., Luna, E., Schramm, A., Tommila, J., Guina, M.
Number of pages: 10
Pages: 1-10
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Physics
Volume: 114
Article number: 174304
ISSN (Print): 0021-8979
Ratings:
Scopus rating (2016): CiteScore 1.72 SJR 0.632 SNIP 0.815
Scopus rating (2015): SJR 0.618 SNIP 0.84 CiteScore 1.57
Scopus rating (2014): SJR 1.005 SNIP 1.18 CiteScore 2.04
Scopus rating (2013): SJR 1.165 SNIP 1.317 CiteScore 2.24
Scopus rating (2012): SJR 1.305 SNIP 1.294 CiteScore 2.13
Scopus rating (2011): SJR 1.373 SNIP 1.318 CiteScore 2.24
Scopus rating (2010): SJR 1.47 SNIP 1.195
Scopus rating (2009): SJR 1.518 SNIP 1.238
Scopus rating (2008): SJR 1.667 SNIP 1.338
Scopus rating (2007): SJR 1.708 SNIP 1.395
Scopus rating (2006): SJR 1.947 SNIP 1.649
Scopus rating (2005): SJR 2.034 SNIP 1.627
Scopus rating (2004): SJR 2.097 SNIP 1.602
Scopus rating (2003): SJR 2.019 SNIP 1.525
Scopus rating (2002): SJR 2.225 SNIP 1.674
Scopus rating (2001): SJR 2.079 SNIP 1.554
Scopus rating (2000): SJR 2.338 SNIP 1.543
Scopus rating (1999): SJR 2.071 SNIP 1.517
Original language: English
DOI: 10.1063/1.4828734

In Situ XPS Studies of Electrochemically Negatively Polarized Molybdenum Carbide Derived Carbon Double Layer Capacitor Electrode

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Low Temperature Gold-to-Gold Bonded Semiconductor Disk Laser

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Lindfors, J., Silvernoinen, M., Kontio, J., Tavast, M., Okhotnikov, O. G.
Number of pages: 4
Pages: 1062-1065
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: IEEE Photonics Technology Letters
Volume: 25
Issue number: 11
ISSN (Print): 1041-1135
Ratings:
Scopus rating (2016): CiteScore 2.52 SJR 1.018 SNIP 1.279
Moth-eye antireflection coating fabricated by nanoimprint lithography on 1 eV dilute nitride solar cell

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Tommila, J., Aho, A., Tukiainen, A., Polojaäri, V., Salmi, J., Niemi, T., Guina, M.
Number of pages: 5
Pages: 1158-1162
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: Progress in Photovoltaics: Research and Applications
Volume: 21
Issue number: 5
ISSN (Print): 1062-7995
Ratings:
Scopus rating (2016): SJR 2.224 SNIP 2.694 CiteScore 6.54
Scopus rating (2015): SJR 2.78 SNIP 3.33 CiteScore 7.31
Scopus rating (2014): SJR 3.279 SNIP 3.874 CiteScore 7.7
Scopus rating (2013): SJR 3.974 SNIP 5.653 CiteScore 8.93
Scopus rating (2012): SJR 3.478 SNIP 5.082 CiteScore 6.81
Scopus rating (2011): SJR 3.251 SNIP 5.999 CiteScore 6.81
Scopus rating (2010): SJR 3.749 SNIP 4.317
Scopus rating (2009): SJR 3.18 SNIP 3.256
Scopus rating (2008): SJR 2.537 SNIP 2.473
Scopus rating (2007): SJR 1.711 SNIP 2.124
Scopus rating (2006): SJR 1.55 SNIP 2.881
Scopus rating (2005): SJR 1.774 SNIP 3.07
Scopus rating (2004): SJR 0.852 SNIP 1.671
Multi-Watt Semiconductor Disk Laser by Low Temperature Wafer Bonding

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Lyytikäinen, J., Heikkinen, J., Kontio, J. M., Okhotnikov, O. G.
Number of pages: 3
Pages: 2233-2235
Publication date: 2013
Peer-reviewed: Yes

**Publication information**
Journal: IEEE Photonics Technology Letters
Volume: 25
Issue number: 22
ISSN (Print): 1041-1135

Ratings:
Scopus rating (2016): CiteScore 2.52 SJR 1.018 SNIP 1.279
Scopus rating (2015): SJR 1.263 SNIP 1.327 CiteScore 2.62
Scopus rating (2014): SJR 1.461 SNIP 1.614 CiteScore 2.78
Scopus rating (2013): SJR 1.487 SNIP 1.547 CiteScore 2.95
Scopus rating (2012): SJR 1.623 SNIP 1.706 CiteScore 2.46
Scopus rating (2011): SJR 1.51 SNIP 2.012 CiteScore 2.48
Scopus rating (2010): SJR 1.474 SNIP 1.623
Scopus rating (2009): SJR 1.775 SNIP 1.804
Scopus rating (2008): SJR 2.081 SNIP 1.818
Scopus rating (2007): SJR 2.345 SNIP 1.566
Scopus rating (2006): SJR 2.112 SNIP 1.884
Scopus rating (2005): SJR 2.97 SNIP 2.454
Scopus rating (2004): SJR 3.286 SNIP 2.716
Scopus rating (2003): SJR 3.44 SNIP 2.467
Scopus rating (2002): SJR 3.566 SNIP 2.117
Scopus rating (2001): SJR 3.519 SNIP 1.678
Scopus rating (2000): SJR 2.345 SNIP 1.202
Scopus rating (1999): SJR 2.44 SNIP 1.302
Original language: English
DOIs:
10.1109/LPT.2013.2284920

**Bibliographical note**
Contribution: organisation=orc,FACT1=1
Portfolio EDEND: 2013-10-29
Publisher name: IEEE
Source: researchoutputwizard
Source-ID: 3225
Optimization of interfacial oxidation properties of FeCr SOFC interconnect alloy

General information
State: Published
Ministry of Education publication type: B2 Part of a book or another research book
Organisations: Optoelectronics Research Centre, Research group: Surface Science
Authors: Ali-Löytty, H., Jussila, P., Hirsimäki, M., Valden, M.
Number of pages: 2
Pages: 1-2
Publication date: 2013

Host publication information
Place of publication: Lund, Sweden
Publisher: MAX-LAB
Links:
https://www.maxlab.lu.se/cmis/display?id=workspace%3A%2F%2FSpacesStore%2F0f1d8b0b-533a-48e6-a4cf-a8509077f6f6
https://www.maxlab.lu.se/node/1693

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2013-11-29
Source: researchoutputwizard
Source-ID: 1912
Research output: Scientific › Chapter

Properties of InAs Quantum Dots in Nanoimprint Lithography Patterned GaAs Pits

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Tommila, J., Schramm, A., Hakkarainen, T., Dumitrescu, M., Guina, M., Heinonen, E.
Number of pages: 2
Pages: 1-2
Publication date: 2013

Host publication information
Title of host publication: CLEO 2013: Applications and Technology, June 9-14, 2013, San Jose, CA, USA
Place of publication: Washington, D.C.
Publisher: OSA - The Optical Society

Publication series
Name: Conference on Lasers and Electro-optics
DOIs:
10.1364/CLEO_AT.2013.JTu4A.65

Bibliographical note
JTu4A.65<br/>Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2013-09-29<br/>Publisher name: OSA - The Optical Society
Source: researchoutputwizard
Source-ID: 3550
Research output: Scientific - peer-review › Conference contribution

Recent progress in wafer-fused VECSELs emitting in the 1310 nm and 1550 nm bands

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
SERS Active Substrates by Liquid Flame Spray and Inkjet Printed Silver Nanoparticles

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Department of Physics, Optoelectronics Research Centre, Engineering materials science and solutions (EMASS), Frontier Photonics
Authors: Saarinen, J. J., Valtakari, D., Haapanen, J., Salminen, T., Mäkelä, J. M., Uozumi, J.
Number of pages: 4
Publication date: 2013

Host publication information
Title of host publication: Advanced Photonics Congress, Integrated Photonics Research, Silicon, and Nano-Photonics (IPR), July 14 - 17, 2013, Rio Grande, Puerto Rico United States
Publisher: The Optical Society; OSA
ISBN (Print): 978-1-55752-981-7

Publication series
Name: Advanced Photonics Congress
DOIs:
10.1364/SENSORS.2013.SW1B.4

Bibliographical note
Contribution: organisation=fys,FACT1=0.5<br>Contribution: organisation=orc,FACT2=0.5<br>Portfolio EDEND: 2013-11-29<br>Publisher name: The Optical Society; OSA
Source-ID: 3323
Research output: Scientific - peer-review › Conference contribution

Silanointiparametrien vaikutus sähkökemiallisesti passivoidun austeniittisen teräksen pinnalle rakentuvan biofunkionaalisen seosilaaniohutkalvon koostumukseen
This thesis examines the chemical composition of a mixed silane thin film synthesized on electrochemically passivated AISI 316L -stainless steel. Silane thin films can be used to enhance the biocompatibility of stainless steel and to create surface functionalities that promote adsorption of biomolecules. Such hybrid materials made of steel and organic coatings can be utilized in e.g. medical implants and tissue engineering.

The goal of this work was to develop deposition equipment needed for the synthesis of silane thin films in order to improve the rate and reproducibility of the sample preparation. The equipment was used to investigate the effect of silanization parameters such as the composition of the silane solution, the hydrolysis time and the silanization time on the structure of the self-assembled thin film. The silane molecules used in this study were amine terminated (3-
aminopropyl)trimethoxysilane (APS) and thiol terminated (3-mercaptopropyl)trimethoxysilane (MPS).

The silanization process was conducted as a liquid phase deposition in atmospheric pressure, which enables the method to be easily adapted to commercial applications. On the other hand, the measurements were performed in ultra-high vacuum utilizing both synchrotron radiation induced and conventional X-ray photoelectron spectroscopy (XPS). The acquired spectra enabled conclusions to be made on the chemical composition and thickness of the silane films. They also provided information on the ratio and orientation of the functional groups.

According to the results, the employed silanization process enables the reproducible manufacturing of approximately one monolayer thick silane films. In addition, the amount of surface functionalities can be adjusted by modifying either the silane concentration in the hydrolysis solution or the silanization time. However, changing the hydrolysis time only affects the chemical bonding between the silane molecules and steel surface, not the total amount of functional groups. Based on the measurements with varying surface sensitivities, it was possible to conclude that the majority of functional groups point outwards. This is an important result considering the adsorption of biomolecules on the surface.

This study found that the hydrolysis rate of different silane species shows considerable variation despite the similar basic structure of the molecules. In the future, the hydrolysis behaviour should be investigated more carefully in the liquid phase. This might help to understand the hydrolysis reactions and also enhance the repeatability of the sample preparation.
1 W at 785 nm from a frequency-doubled wafer-fused semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Rautiainen, J., Lyytikäinen, J., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O. G.
Pages: 9046-9051
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 20
Issue number: 8
ISSN (Print): 1094-4087
Ratings:

Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
200 GHz 1 W semiconductor disc laser emitting 800 fs pulses

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Saarinen, E., Rantamäki, A., Chamorovskiy, A., Okhotnikov, O. G.
Pages: 1355-1356
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Electronics Letters
Volume: 48
Issue number: 21
ISSN (Print): 0013-5194
Ratings:
Scopus rating (2016): SJR 0.442 SNIP 0.882 CiteScore 1.35
Scopus rating (2015): SJR 0.497 SNIP 1.011 CiteScore 1.31
Scopus rating (2014): SJR 0.522 SNIP 1.061 CiteScore 1.31
Scopus rating (2013): SJR 0.59 SNIP 1.155 CiteScore 1.45
Scopus rating (2012): SJR 0.631 SNIP 1.161 CiteScore 1.45
Scopus rating (2011): SJR 0.634 SNIP 1.098 CiteScore 1.44
Scopus rating (2010): SJR 0.637 SNIP 1.011
Scopus rating (2009): SJR 0.728 SNIP 1.072
Scopus rating (2008): SJR 0.843 SNIP 0.957
Scopus rating (2007): SJR 0.924 SNIP 1.169
Scopus rating (2006): SJR 0.863 SNIP 1.192
Scopus rating (2005): SJR 1.048 SNIP 1.298
Scopus rating (2004): SJR 1.156 SNIP 1.354
Scopus rating (2003): SJR 1.372 SNIP 1.352
Scopus rating (2002): SJR 1.572 SNIP 1.202
Scopus rating (2001): SJR 1.591 SNIP 1.042
Scopus rating (2000): SJR 1.264 SNIP 0.951
Scopus rating (1999): SJR 1.443 SNIP 1.074
Original language: English
DOIs: 10.1049/el.2012.2443

Bibliographical note
Contribution: organisation=orc,FACT1=1
Publisher name: Institution of Engineering and Technology IET
Source: researchoutputwizard
Source-ID: 5233
Research output: Scientific - peer-review Article
200 GHz 800 fs 1 W Semiconductor Disk Laser Mode-Locked by a SESAM with a Diamond Heat Spreader

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers
Authors: Saarinen, E. J., Rantamäki, A., Chamorovskiy, A., Okhotnikov, O. G.
Publication date: 2012

Host publication information
Title of host publication: 15th International Conference Laser Optics 2012, St. Petersburg, 25-29 June 2012
Research output: Scientific - peer-review › Conference contribution

2 W 1.2 µm flip-chip quantum dot semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Ultrafast and intense lasers, Innolume GmbH, Dortmund 44263, Germany, Photonics and Nanoscience Group, School of Engineering, Physics and Mathematics, University of Dundee, Dundee DD1 4HN, U.K.
Authors: Rantamäki, A., Rautiainen, J. T., Toikkanen, L. J., Krestnikov, I., Butkus, M., Rafailov, E. U., Okhotnikov, O.
Publication date: 2012

Host publication information
Title of host publication: 15th International Conference Laser Optics 2012, St. Petersburg, 25-29 June 2012
Research output: Scientific - peer-review › Conference contribution

4.6-W Single Frequency Semiconductor Disk Laser With < 75-kHz Linewidth

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Chamorovskiy, A., Lyytikäinen, J., Okhotnikov, O. G.
Pages: 1378-1380
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: IEEE Photonics Technology Letters
Volume: 24
Issue number: 16
ISSN (Print): 1041-1135
Ratings:
Scopus rating (2016): CiteScore 2.52 SJR 1.018 SNIP 1.279
Scopus rating (2015): SJR 1.263 SNIP 1.327 CiteScore 2.62
Scopus rating (2014): SJR 1.461 SNIP 1.614 CiteScore 2.78
Scopus rating (2013): SJR 1.487 SNIP 1.547 CiteScore 2.95
Scopus rating (2012): SJR 1.623 SNIP 1.706 CiteScore 2.46
Scopus rating (2011): SJR 1.51 SNIP 2.012 CiteScore 2.48
Scopus rating (2010): SJR 1.474 SNIP 1.623
Scopus rating (2009): SJR 1.775 SNIP 1.804
Scopus rating (2008): SJR 2.081 SNIP 1.818
Scopus rating (2007): SJR 2.345 SNIP 1.566
Scopus rating (2006): SJR 2.112 SNIP 1.884
Scopus rating (2005): SJR 2.97 SNIP 2.454
Scopus rating (2004): SJR 3.286 SNIP 2.716
Scopus rating (2003): SJR 3.44 SNIP 2.467
AlInP-based rolled-up microtube resonators with colloidal nanocrystals operating in the visible spectral range

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications, Augmented Human Activities (AHA), Frontier Photonics
Authors: Strelow, C., Kietzmannm, S., Schramm, A., Seher, R., Penttinen, J., Hakkarainen, T., Mews, A., Kipp, T.
Number of pages: 5
Pages: 1-5
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: APPLIED PHYSICS LETTERS
Volume: 101
Issue number: 11
Article number: 113114
ISSN (Print): 0003-6951
Ratings:
Scopus rating (2016): CiteScore 2.67 SJR 1.132 SNIP 0.996
Scopus rating (2015): SJR 1.085 SNIP 0.983 CiteScore 2.47
Scopus rating (2014): SJR 1.799 SNIP 1.462 CiteScore 3.25
Scopus rating (2013): SJR 2.149 SNIP 1.652 CiteScore 3.77
Scopus rating (2012): SJR 2.554 SNIP 1.754 CiteScore 3.76
Scopus rating (2011): SJR 2.805 SNIP 1.94 CiteScore 4.04
Scopus rating (2010): SJR 2.926 SNIP 1.789
Scopus rating (2009): SJR 2.857 SNIP 1.848
Scopus rating (2008): SJR 2.934 SNIP 1.83
Scopus rating (2007): SJR 3.039 SNIP 1.913
Scopus rating (2006): SJR 3.457 SNIP 2.288
Scopus rating (2005): SJR 3.709 SNIP 2.382
Scopus rating (2004): SJR 3.904 SNIP 2.38
Scopus rating (2003): SJR 3.765 SNIP 2.27
Scopus rating (2002): SJR 3.917 SNIP 2.365
Scopus rating (2001): SJR 4.111 SNIP 2.212
Scopus rating (2000): SJR 4.277 SNIP 2.013
Scopus rating (1999): SJR 4.35 SNIP 2.11
Original language: English
DOIs: 10.1063/1.4752449

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: American Institute of Physics
Source: researchoutputwizard
Source-ID: 5360
An analysis of Hall mobility in as-grown and annealed n- and p-type modulation-doped GaInNAs/GaAs quantum wells

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Sarcan, F., Donmez, O., Gunes, M., Erol, A., Arikan, M. C., Puustinen, J., Guina, M.
Number of pages: 5
Pages: 1-5
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 7
Article number: 529
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Scopus rating (2008): SJR 0.828 SNIP 0.632
Scopus rating (2007): SJR 1.458 SNIP 0.71
Original language: English
DOIs: 10.1186/1556-276X-7-529

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: SpringerOpen
Source: researchoutputwizard
Source-ID: 5278
Research output: Scientific - peer-review › Article

Capacitance-voltage characterization of III-V semiconductor solar cells

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Salmi, J., Aho, A., Tukiainen, A., Polojärvi, V., Schramm, A., Guina, M.
Number of pages: 1
Pages: 1-1
Publication date: 2012

Host publication information
Title of host publication: Physics Days 2012, the 46th annual meeting of the Finnish Physical Society, 13.-15.3.2012, Joensuu, Finland
Place of publication: Joensuu
Publisher: University of Eastern Finland; Suomen fyysikkoseura

Publication series
Name: Physics Days / Fysiikan päivät : Annual Meeting of the Finnish Physical Society
Publisher: University of Eastern Finland; Suomen fyysikkoseura
Links:
http://www.uef.fi/c/document_library/get_file?uuid=41e478a5-dda0-49bf-90e0-e4013cc1196d&groupId=1326215&p_l_id=1326219
Comparison of GaInNAs and GaInNAsSb Solar Cells Grown by Plasma-Assisted Molecular Beam Epitaxy

**General information**
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Aho, A., Tukiainen, A., Korpijärvi, V., Polojärvi, V., Salmi, J., Guina, M.
Pages: 49-52
Publication date: 2012

**Host publication information**
Title of host publication: 8th International Conference on Concentrating Photovoltaic Systems, CVT-8, April 16 - 18, 2012, Toledo, Spain. AIP Conference Proceedings
Publisher: American Institute of Physics AIP
Editors: Frank, D., Francisca, R., Ignacio, A.

**Publication series**
Name: AIP Conference Proceedings
Volume: 1477
ISSN (Print): 0094-243X
ISSN (Electronic): 1551-7616
DOI:
10.1063/1.4753831

**Bibliographical note**
Contribution: organisation=orc,FACT1=1<br/>Publisher name: American Institute of Physics AIP
Source: researchoutputwizard
Source-ID: 3809
Research output: Scientific - peer-review › Conference contribution

Conventional nanoindentation in self-assembled monolayers deposited on gold and silver substrates

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Costelle, L., Lind, L., Jalkanen, P., Räisänen, M. T., Nowak, R., Räisänen, J.
Publication date: 2012
Peer-reviewed: Yes

**Publication information**
Journal: Journal of Nanomaterials
Volume: 2012
Article number: 585123
ISSN (Print): 1687-4110
Ratings:
Scopus rating (2016): SJR 0.345 SNIP 0.454 CiteScore 1.13
Scopus rating (2015): SJR 0.385 SNIP 0.533 CiteScore 1.26
Scopus rating (2014): SJR 0.397 SNIP 0.557 CiteScore 1.12
Scopus rating (2013): SJR 0.374 SNIP 0.516 CiteScore 1.01
Scopus rating (2012): SJR 0.356 SNIP 0.443 CiteScore 0.93
Scopus rating (2011): SJR 0.422 SNIP 0.44 CiteScore 0.97
Scopus rating (2010): SJR 0.411 SNIP 0.395
Scopus rating (2009): SJR 0.358 SNIP 0.362
Scopus rating (2008): SJR 0.205 SNIP 0.2
Scopus rating (2007): SJR 0.144 SNIP 0.07
Original language: English
DOIs:
10.1155/2012/585123

Bibliographical note
Contribution: organisation=orc,FACT1=1<Publisher name: Hindawi Publishing
Source: researchoutputwizard
Source-ID: 3978
Research output: Scientific - peer-review › Article

Dilute nitride and GaAs n-i-p-i solar cells

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Mazzucato, S., Royall, B., Ketlhwaafetse, R., Balkan, N., Salmi, J., Puustinen, J., Guina, M., Smith, A., Gwilliam, R.
Number of pages: 12
Pages: 1-12
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 7
Issue number: 631
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Scopus rating (2008): SJR 0.828 SNIP 0.632
Scopus rating (2007): SJR 1.458 SNIP 0.71
Original language: English
DOIs:
10.1186/1556-276X-7-631

Bibliographical note
Contribution: organisation=orc,FACT1=1<Publisher name: SpringerOpen
Source: researchoutputwizard
Source-ID: 4838
Research output: Scientific - peer-review › Article

Effect of different annealing temperatures and SiO2/Si(100) substrate on the properties of nickel containing titania thin sol-gel films

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research group: Surface Science, Frontier Photonics
Authors: Pärna, R., Joost, U., Nommiste, E., Käämbre, T., Kikas, A., Kuusik, I., Kink, I., Hirsimäki, M., Kisand, V.
Pages: 953-965
Publication date: 2012
Peer-reviewed: Yes
Excitation energy-dependent nature of Raman scattering spectrum in GaInNAs/GaAs quantum well structures
Flip Chip Quantum-Dot Semiconductor Disk Laser at 1200 nm

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Rautiainen, J., Toikkanen, L., Krestnikov, I., Butkus, M., Rafailov, E. U., Okhotnikov, O. G.
Pages: 1292-1294
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: IEEE Photonics Technology Letters
Volume: 24
Issue number: 15
Article number: 12817485
ISSN (Print): 1041-1135
Ratings:
Scopus rating (2016): CiteScore 2.52 SJR 1.018 SNIP 1.279
Scopus rating (2015): SJR 1.263 SNIP 1.327 CiteScore 2.62
Scopus rating (2014): SJR 1.461 SNIP 1.614 CiteScore 2.78
Scopus rating (2013): SJR 1.487 SNIP 1.547 CiteScore 2.95
Scopus rating (2012): SJR 1.623 SNIP 1.706 CiteScore 2.46
Scopus rating (2011): SJR 1.51 SNIP 2.012 CiteScore 2.48
Scopus rating (2010): SJR 1.474 SNIP 1.623
Scopus rating (2009): SJR 1.775 SNIP 1.804
Scopus rating (2008): SJR 2.081 SNIP 1.818
Scopus rating (2007): SJR 2.345 SNIP 1.566
Scopus rating (2006): SJR 2.112 SNIP 1.884
Scopus rating (2005): SJR 2.97 SNIP 2.454
Scopus rating (2004): SJR 3.286 SNIP 2.716
Scopus rating (2003): SJR 3.44 SNIP 2.467
Scopus rating (2002): SJR 3.566 SNIP 2.117
Scopus rating (2001): SJR 3.519 SNIP 1.678
Scopus rating (2000): SJR 2.345 SNIP 1.202
Scopus rating (1999): SJR 2.44 SNIP 1.302
Original language: English
DOIs:
10.1109/LPT.2012.2202222

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: SpringerOpen
Source: researchoutputwizard
Source-ID: 4045
Research output: Scientific - peer-review › Article
Large array of single, site-controlled InAs quantum dots fabricated by UV-nanoimprint lithography and molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Schramm, A., Tommila, J., Sterlow, C., Hakkarainen, T. V., Tukiainen, A., Dumitrescu, M., Mews, A., Kipp, T., Guina, M.
Number of pages: 4
Pages: 1-4
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Nanotechnology
Volume: 23
Issue number: 17
Article number: 175701
ISSN (Print): 0957-4484
Ratings:
Scopus rating (2016): CiteScore 2.87 SJR 1.096 SNIP 0.814
Scopus rating (2015): SJR 1.18 SNIP 0.966 CiteScore 3.07
Scopus rating (2014): SJR 1.465 SNIP 1.258 CiteScore 3.09
Scopus rating (2013): SJR 1.585 SNIP 1.244 CiteScore 2.74
Scopus rating (2012): SJR 1.846 SNIP 1.306 CiteScore 3.34
Laterally-coupled high power GaSb distributed feedback lasers fabricated by nanoimprint lithography at 2 μm wavelength

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Haring, K., Paajaste, J., Koskinen, R., Suomalainen, S., Viheriälä, J., Laakso, A., Niemi, T., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2012

Host publication information
Place of publication: Bellingham, WA
Publisher: SPIE
Editors: Krassimir, P., Marc, S., Angel, V., Rainer, M.
Article number: 84320T
ISBN (Print): 978-0-8194-9124-4

Publication series
Name: Conference on Semiconductor Lasers and Laser Dynamics
Volume: 8432
ISSN (Print): 0277-786X
DOIs:
10.1117/12.922811

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: SPIE
Source: researchoutputwizard
Source-ID: 4151
Research output: Scientific - peer-review › Conference contribution

MBE Growth of High Current Dilute III-V-N Single and Triple Junction Solar Cells

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Optical properties of site-controlled single quantum dots

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Schramm, A., Strelow, C., Tommila, J., Hakkarainen, T. V., Polojarvi, V., Dumitrescu, M., Kipp, T., Guina, M.
Number of pages: 1
Pages: 1-1
Publication date: 2012

Host publication information
Title of host publication: Physics Days 2012, the 46th annual meeting of the Finnish Physical Society, 13.-15.3.2012, Joensuu, Finland
Place of publication: Joensuu
Publisher: University of Eastern Finland; Suomen fyysikkoseura

Publication series
Name: Physics Days / Fysiikan päivät : Annual Meeting of the Finnish Physical Society
Publisher: University of Eastern Finland; Suomen fyysikkoseura
Links:
http://www.uef.fi/c/document_library/get_file?uuid=41e478a5-dda0-49bf-90e0-e4013cc119ed&groupId=1326215&p_l_id=1326219

Bibliographical note
Oral presentation<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 5299
Research output: Scientific › Conference contribution

Post-growth annealing of type-II GaSb/GaAs quantum dots grown with different V/III ratios

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Polojarvi, V., Gubanov, A., Schramm, A., Koskinen, R., Paajaste, J., Salmi, J., Suomalainen, S., Guina, M.
Pages: 1103-1107
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Materials Science and Engineering B - Advanced Functional Solid-State Materials
Volume: 177
Issue number: 13
ISSN (Print): 0921-5107
Ratings:
Scopus rating (2016): SJR 0.706 SNIP 1.035 CiteScore 2.4
Scopus rating (2015): SJR 0.715 SNIP 1.092 CiteScore 2.31
Scopus rating (2014): SJR 0.795 SNIP 1.351 CiteScore 2.58
Scopus rating (2013): SJR 0.747 SNIP 1.226 CiteScore 2.11
Scopus rating (2012): SJR 0.777 SNIP 1.151 CiteScore 1.82
Scopus rating (2011): SJR 0.743 SNIP 1.065 CiteScore 1.66
Scopus rating (2010): SJR 0.9 SNIP 1.055
Scopus rating (2009): SJR 0.939 SNIP 1.183
Scopus rating (2008): SJR 0.922 SNIP 1.161
Scopus rating (2007): SJR 0.92 SNIP 1
Scopus rating (2006): SJR 0.822 SNIP 0.977
Scopus rating (2005): SJR 0.803 SNIP 0.989
Scopus rating (2004): SJR 0.731 SNIP 0.788
Scopus rating (2003): SJR 0.86 SNIP 0.831
Scopus rating (2002): SJR 0.793 SNIP 0.826
Quantum dots in III-V semiconductor solar cells

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Polojärvi, V., Schramm, A., Tukiainen, A., Salmi, J., Aho, A., Pavelescu, E., Puustinen, J., Zhang, W., Guina, M.
Number of pages: 1
Pages: 1-1
Publication date: 2012

Host publication information
Title of host publication: Physics Days 2012, the 46th annual meeting of the Finnish Physical Society, 13.-15.3.2012, Joensuu, Finland
Place of publication: Joensuu
Publisher: University of Eastern Finland; Suomen fyysikkoseura

Publication series
Name: Physics Days / Fysiikan päivät : Annual Meeting of the Finnish Physical Society
Publisher: University of Eastern Finland; Suomen fyysikkoseura
Links:
http://www.uef.fi/c/document_library/get_file?uuid=41e478a5-dda0-49bf-90e0-e4013cc1196d&groupId=1326215&p_l_id=1326219

Bibliographical note
ei ut-numeroa 28.8.2013<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 5082
Research output: Scientific › Conference contribution

Removal of strain relaxation induced defects by flushing of InAs quantum dots

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Polojärvi, V., Schramm, A., Aho, A., Tukiainen, A., Guina, M.
Number of pages: 5
Pages: 1-5
Publication date: 2012
Peer-reviewed: Yes

Publication information
Volume: 45
Issue number: 36
Article number: 365107
ISSN (Print): 0022-3727

Ratings:
Scopus rating (2016): CiteScore 2.07 SJR 0.645 SNIP 0.917
Selective Area Heteroepitaxy of InP Nanopyramidal Frusta on Si for Nanophotonics

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Metaferia, W., Tommila, J., Kataria, H., Junesand, C., Yanting, S., Guina, M., Niemi, T., Lourdudoss, S.
Number of pages: 4
Pages: 81-84
Publication date: 2012

Host publication information
Place of publication: New York, NY
Publisher: IEEE

Publication series
Name: Indium Phosphide and Related Materials Conference
ISSN (Print): 1092-8669
DOIs: 10.1109/ICIPRM.2012.6403324

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Portfolio EDEND: 2013-05-29<br/>Publisher name: IEEE

Single-step fabrication of luminescent GaAs nanocrystals by pulsed laser ablation in liquids

General information
Strain compensation of InGaAs/GaAs SDL gain mirrors grown by molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Ranta, S., Leinonen, T., Tavast, M., Hakkarainen, T. V., Suominen, I., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2012

Host publication information
Place of publication: Bellingham, WA
Publisher: SPIE
Editor: Tropper, A. C.
Article number: 824211

Publication series
Name: Conference on Vertical External Cavity Surface Emitting Lasers VECSELs II, Photonics West LASE: Lasers and Applications
Volume: 8242
ISSN (Print): 0277-786X
DOIs:
10.1117/12.908094

Bibliographical note
Poster [8242-36]SPTue<br/>Contribution: organisation=orc,FACT1=1<br/>Publisher name: SPIE
Source: researchoutputwizard
Source-ID: 5142
Research output: Scientific - peer-review › Conference contribution
Study of nitrogen incorporation into GaInNAs: The role of growth temperature in molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Korpijärvi, V., Aho, A., Laukkanen, P., Tukiainen, A., Laakso, A., Tuominen, M., Guina, M.
Number of pages: 5
Pages: 1-5
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Physics
Volume: 112
Issue number: 2
Article number: 023504
ISSN (Print): 0021-8979
Ratings:
Scopus rating (2016): CiteScore 1.72 SJR 0.632 SNIP 0.815
Scopus rating (2015): SJR 0.618 SNIP 0.84 CiteScore 1.57
Scopus rating (2014): SJR 1.005 SNIP 1.18 CiteScore 2.04
Scopus rating (2013): SJR 1.165 SNIP 1.317 CiteScore 2.24
Scopus rating (2012): SJR 1.305 SNIP 1.294 CiteScore 2.13
Scopus rating (2011): SJR 1.373 SNIP 1.318 CiteScore 2.24
Scopus rating (2010): SJR 1.47 SNIP 1.195
Scopus rating (2009): SJR 1.518 SNIP 1.238
Scopus rating (2008): SJR 1.667 SNIP 1.338
Scopus rating (2007): SJR 1.708 SNIP 1.395
Scopus rating (2006): SJR 1.947 SNIP 1.649
Scopus rating (2005): SJR 2.034 SNIP 1.627
Scopus rating (2004): SJR 2.097 SNIP 1.602
Scopus rating (2003): SJR 2.019 SNIP 1.525
Scopus rating (2002): SJR 2.225 SNIP 1.674
Scopus rating (2001): SJR 2.079 SNIP 1.554
Scopus rating (2000): SJR 2.338 SNIP 1.543
Scopus rating (1999): SJR 2.071 SNIP 1.517
Original language: English
DOIs:
10.1063/1.4737127

Bibliographical note
Contribution: organisation=orc,FACT1=1<br/>Publisher name: American Institute of Physics AIP
Source: researchoutputwizard
Source-ID: 4527
Research output: Scientific - peer-review › Article

The effect of InGaAs strain-reducing layer on the optical properties of InAs quantum dot chains grown on patterned GaAs(100)

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Hakkarainen, T., Schramm, A., Tommila, J., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2012
Peer-reviewed: Yes

Publication information
The Influence of post-growth annealing on the optical properties of InAs quantum dot chains grown on pre-patterned GaAs(100)

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Hakkarainen, T. V., Polojärvi, V., Schramm, A., Tommila, J., Guina, M.
Number of pages: 6
Pages: 1-6
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Nanotechnology
Volume: 23
Issue number: 11
Article number: 115702
ISSN (Print): 0957-4484
Ratings:
Scopus rating (2016): CiteScore 2.87 SJR 1.096 SNIP 0.814
Scopus rating (2015): SJR 1.18 SNIP 0.966 CiteScore 3.07
Scopus rating (2014): SJR 1.465 SNIP 1.258 CiteScore 3.09
Scopus rating (2013): SJR 1.585 SNIP 1.244 CiteScore 2.74
Scopus rating (2012): SJR 1.846 SNIP 1.306 CiteScore 3.34
The influence of temperature on the photoluminescence properties of single InAs quantum dots grown on patterned GaAs

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Tommila, J., Strelow, C., Schramm, A., Hakkarainen, T. V., Dumitrescu, M., Kipp, T., Guina, M.
Number of pages: 4
Publication date: 2012
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 7
Article number: 313
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Scopus rating (2008): SJR 0.828 SNIP 0.632
Scopus rating (2007): SJR 1.458 SNIP 0.71
Original language: English
DOIs:
10.1186/1556-276X-7-313

Bibliographical note
Contribution: organisation=orc,FACT1=1
Publisher name: SpringerOpen
Source: researchoutputwizard
Source-ID: 5436
Research output: Scientific - peer-review › Article
Towards active plasmonics

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Simonen, J., Okamoto, T., H’Dhili, F., Feng, J., Kawata, S.
Pages: 22-23
Publication date: 2012

Host publication information
Title of host publication: Riken Symposium 10th Nanophotonics & Metamaterial Symposium: Nanophotonics Laboratory: The Commencement. Technical Digest, February 29, 2012, Tokyo, Japan
Place of publication: Tokyo
Publisher: Nanophotonics Laboratory, Riken

Publication series
Name: Riken Symposium: Nanophotonics & Metamaterials Symposium

Bibliographical note
Ei UT-numeroa 29.8.2013.Invited paper<br/>Contribution: organisation=orc,FACT1=1<br/>Publisher name: Nanophotonics Laboratory, Riken
Source: researchoutputwizard
Source-ID: 5329
Research output: Scientific - peer-review › Conference contribution

11 W single gain element dilute nitride disk laser emitting at 1180 nm

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Leinonen, T., Korpijärvi, V., Puustinen, J., Epstein, R., Guina, M.
Number of pages: 7
Pages: 1-7
Publication date: 2011

Host publication information
Title of host publication: Vertical External Cavity Surface Emitting Lasers (VECSELs), Photonics West 2011, Jan 22 - 27, 2011, San Fransisco, CA, USA. Proceedings of SPIE
Place of publication: Bellingham, WA
Publisher: SPIE
Editor: Keller, U.
Article number: 791905
ISBN (Print): 978-081-948-456-7

Publication series
Name: Photonics West Conference
Publisher: SPIE
Volume: 7919
DOIs: 10.1117/12.875318

Bibliographical note
SA project Mignon.S1 [7919-04].CD-ROM ja verkkojulkaisu.<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 6594
Research output: Scientific - peer-review › Conference contribution

1.3 µm Raman-bismuth fiber amplifier pumped by semiconductor disk laser

General information
State: Published
Cantilever actuator processing to control the photoluminescence of quantum wells coupled across nanoscale air gaps

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Chan, W. S., Saarinen, M. J., Talghader, J. J.
Pages: 151-152
Publication date: 2011

Host publication information
Title of host publication: IEEE International Conference on Optical MEMS and Nanophotonics OMN2011, Istanbul, Turkey, August 8-11, 2011
Place of publication: Piscataway, NJ
Publisher: IEEE

Publication series
Name: IEEE International Conference on Optical MEMS and Nanophotonics OMN
Publisher: IEEE
Effect of thermal management on the properties of saturable absorber mirrors in high-power mode-locked semiconductor disk lasers

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Rantamäki, A., Lyytikäinen, J., Nikkinen, J., Okhotnikov, O. G.
Pages: 786-789
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Quantum Electronics
Volume: 41
Issue number: 9
ISSN (Print): 1063-7818
Ratings:
Scopus rating (2016): SJR 0.491 SNIP 1.101 CiteScore 1.13
Scopus rating (2015): SJR 0.582 SNIP 1.193 CiteScore 1.07
Scopus rating (2014): SJR 0.531 SNIP 0.927 CiteScore 0.89
Scopus rating (2013): SJR 0.555 SNIP 1.062 CiteScore 0.94
Scopus rating (2012): SJR 0.433 SNIP 0.822 CiteScore 0.69
Scopus rating (2011): SJR 0.438 SNIP 0.911 CiteScore 0.7
Scopus rating (2010): SJR 0.415 SNIP 0.852
Scopus rating (2009): SJR 0.444 SNIP 1.039
Scopus rating (2008): SJR 0.459 SNIP 0.877
Scopus rating (2007): SJR 0.391 SNIP 0.776
Scopus rating (2006): SJR 0.286 SNIP 0.747
Scopus rating (2005): SJR 0.302 SNIP 0.719
Scopus rating (2004): SJR 0.272 SNIP 0.803
Scopus rating (2003): SJR 0.318 SNIP 0.547
Scopus rating (2002): SJR 0.253 SNIP 0.766
Scopus rating (2001): SJR 0.363 SNIP 0.705
Scopus rating (2000): SJR 0.376 SNIP 0.485
Scopus rating (1999): SJR 0.357 SNIP 0.438
Original language: English
DOIs:
10.1070/QE2011v041n09ABEH014658

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7091
Research output: Scientific - peer-review › Article

Experimentally defined electronic properties of InGaAsN: input for solar cell simulations

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Pages: 621-624
Focusing effect of a graded index photonic crystal lens

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Tan, C., Niemi, T., Peng, C., Pessa, M.
Pages: 3140-3143
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Optics Communications
Volume: 284
Issue number: 12
ISSN (Print): 0030-4018
Ratings:
Scopus rating (2016): SJR 0.633 SNIP 0.924 CiteScore 1.65
Scopus rating (2015): SJR 0.711 SNIP 0.987 CiteScore 1.62
Scopus rating (2014): SJR 0.719 SNIP 1.058 CiteScore 1.62
Scopus rating (2013): SJR 0.746 SNIP 1.175 CiteScore 1.78
Scopus rating (2012): SJR 0.813 SNIP 1.151 CiteScore 1.63
Scopus rating (2011): SJR 0.814 SNIP 1.21 CiteScore 1.62
Scopus rating (2010): SJR 0.935 SNIP 1.18
Scopus rating (2009): SJR 1.047 SNIP 1.218
Scopus rating (2008): SJR 1.139 SNIP 1.24
Scopus rating (2007): SJR 1.069 SNIP 1.069
Scopus rating (2006): SJR 1.065 SNIP 1.214
Scopus rating (2005): SJR 1.239 SNIP 1.363
Scopus rating (2004): SJR 1.281 SNIP 1.407
Scopus rating (2003): SJR 1.335 SNIP 1.28
Scopus rating (2002): SJR 1.195 SNIP 1.247
Scopus rating (2001): SJR 1.243 SNIP 1.232
Scopus rating (2000): SJR 1.077 SNIP 0.887
Scopus rating (1999): SJR 1.29 SNIP 0.825
Original language: English
DOIs:
10.1016/j.optcom.2011.02.067

Bibliographical note
GaAs-SOI integration as a path to low-cost optical interconnects

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Aalto, T., Harjanne, M., Kapulainen, M., Ylinen, S., Guina, M., Haring, K., Puustinen, J., Mikhrin, V.
Number of pages: 8
Pages: 1-8
Publication date: 2011

Host publication information
Place of publication: Bellingham, WA
Publisher: SPIE
Editors: Broquin, J. E., Conti, G. N.
Article number: 79410S
ISBN (Print): 978-0-81948-478-9

Bibliographical note
Tekes project FLIPSOI, verkkojulkaisu ja CD-ROM

Giant enhancement of second-harmonic generation in SiNx resonant waveguide grating

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre, Department of Physics
Authors: Pietarinen, H., Hyvärinen, O., Kumar, R., Kapals, T., Simonen, J., Genty, G., Kauranen, M.
Pages: 365-365
Publication date: 2011

Host publication information
Place of publication: Helsinki
Publisher: University of Helsinki
Editors: Dal Maso, M., Holmström, E.
ISBN (Print): 978-952-10-6872-0

Publication series
Name: Physics Days Annual Conference of the Finnish Physical Society and the Second Nordic Physics Meeting
Publisher: University of Helsinki
Volume: HU-P-D178
ISSN (Print): 0356-0961
Links:
Improving the emission efficiency of periodic plasmonic structures for lasing applications

We report on a two dimensional plasmonic structure that utilizes an Ag film for the generation of surface plasmons and a layer of the organic semiconductor tri(8-hydroxyquinoline) aluminum (Alq3) doped with the laser dye 4-dicyanmethylen-2-methyl-6-(p-dimethylaminostyryl)-4 H-pyran (DCM) as an active medium. The dispersion diagram of this structure exhibits a plasmonic bandgap in the dye emission wavelength range. At the flat band-edge, the group velocity tends to zero, so that the density of surface plasmon modes is high. This may yield a lasing action. However, the device suffers from the energy dissipation due to metal absorption and unwanted radiation. We examine how some of them may be overcome.

Firstly, we propose the use of long range surface plasmons (LRSPs) characterized by a low loss coefficient. To this end, we investigate theoretically and experimentally the best conditions for the excitation of these modes. A strong emission is observed compared to that from a planar structure. These modes provide a high performance—an enhancement factor of 3—when the dye thickness is about 100 nm, a value consistent with the numerical findings. We further demonstrate that the use of a spacer layer significantly increases the emission efficiency. Finally, we suggest a specific design for the laser structure for minimal radiation loss.


**InAs Quantum Dot Chains Grown on Nanoimprint Lithography Patterned GaAs(100)**

**General information**
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Hakkarainen, T. V., Schramm, A., Tommila, J., Tukiainen, A., Ahorinta, R., Dumitrescu, M., Guina, M.
Pages: 43-43
Publication date: 2011

**Host publication information**
Title of host publication: EURO MBE, March 20 - 23, 2011, Alpe d'Huez, France Alps
Place of publication: Alpe d'Huez
Publisher: Euro-MBE

**Publication series**
Name: EURO MBE
Publisher: Euro-MBE

**Bibliographical note**
Mo1.5. ei ut-numeroa 8.3.2014<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 6006
Research output: Scientific › Conference contribution

---

**Lattice matched dilute nitride materials for III-V high-efficiency multi-junction solar cells: growth parameter optimization in molecular beam epitaxy**

**General information**
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Aho, A., Tukiainen, A., Polojärvi, V., Korpijärvi, V., Gubanov, A., Salmi, J., Guina, M., Laukkanen, P.
Pages: 58-61
Publication date: 2011

**Host publication information**
Title of host publication: EU PVSEC 2011, 26th European Photovoltaic Solar Energy Conference and Exhibition, September 5 - 9, 2011, Hamburg, Germany
Place of publication: Hamburg
Publisher: EU PVSEC

**Publication series**
Name: European Photovoltaic Solar Energy Conference and Exhibition EU PVSEC
Publisher: EU PVSEC
DOI:
10.4229/26thEUPVSEC2011-1AO.8.3

**Bibliographical note**
Tekes project Solar III-V. Oral presentation 1AO.8.3<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 5656
Research output: Scientific - peer-review › Conference contribution

---

**Low-noise Raman fiber amplifier pumped by semiconductor disk laser**

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
ME-grown dilute nitride materials: Ready for high-efficiency III-V multijunction solar cells?

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Tukiainen, A., Aho, A., Polojärvi, V., Salmi, J., Gubanov, A., Ahorinta, R., Guina, M.
Pages: 295-295
Publication date: 2011

Host publication information
Place of publication: Helsinki
Publisher: University of Helsinki
Editors: Dal Maso, M., Holmström, E.
ISBN (Print): 978-952-10-6872-0

Publication series
Name: Physics Days Annual Conference of the Finnish Physical Society and the Second Nordic Physics Meeting
Publisher: University of Helsinki
Volume: HU-P-D178
Moth-eye antireflection coatings fabricated by nanoimprint lithography on dilute nitride solar cell

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Tommila, J., Polojärvi, V., Tukiainen, A., Salmi, J., Puustinen, J., Aho, A., Ranta, S., Niemi, T., Guina, M.
Pages: 367-369
Publication date: 2011

Host publication information
Title of host publication: EU PVSEC 2011, 26th European Photovoltaic Solar Energy Conference and Exhibition, September 5 - 9, 2011, Hamburg, Germany
Place of publication: Hamburg
Publisher: EU PVSEC

Publication series
Name: European Photovoltaic Solar Energy Conference and Exhibition EU PVSEC
Publisher: EU PVSEC
DOIs: 10.4229/26thEUPVSEC2011-1DV.1.7

Bibliographical note
Tekes projects Solar III-V.Poster 1DV.1.7

Multi-beam laser interference lithography pattern

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Wei, Z., Weiping, L., Xiaoyong, G., Tan, C., Peng, C.
Pages: 3157-3162
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: High Power Laser and Particle Beams
Volume: 23
Issue number: 12
ISSN (Print): 1001-4322
Ratings:
Scopus rating (2016): SJR 0.238 SNIP 0.492 CiteScore 0.38
Scopus rating (2015): SJR 0.248 SNIP 0.767 CiteScore 0.75
Scopus rating (2014): SJR 0.244 SNIP 0.945 CiteScore 0.8
Scopus rating (2013): SJR 0.248 SNIP 0.611 CiteScore 0.41
Scopus rating (2012): SJR 0.249 SNIP 0.609 CiteScore 0.38
Scopus rating (2011): SJR 0.251 SNIP 0.769 CiteScore 0.45
Scopus rating (2010): SJR 0.267 SNIP 0.898
Multiple gain cavity for power scaling in passively mode-locked semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Saarinen, E. J., Lyytikäinen, J., Okhotnikov, O. G.
Number of pages: 5
Pages: 1-5
Publication date: 2011

Host publication information
Title of host publication: Laser Optics 2010, June 28, 2010 St Petersburg, Russia. Proceedings of SPIE
Place of publication: Bellingham, WA
Publisher: SPIE
Editors: Rosanov, N. N., Venediktov, V. Y.
Article number: 782209
ISBN (Print): 978-0-81948-331-7
DOIs:
10.1117/12.884968

Bibliographical note
Talk, TuR3-10<br>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7093
Research output: Scientific - peer-review › Conference contribution

Nanoimprint devices fabricated using nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Niemi, T.
Pages: 40-41
Publication date: 2011

Host publication information
Title of host publication: PALS 2011 - The 5th Finnish-Russian Photonics and Laser Symposium, Saint-Petersburg, Russia, October 18 - 20, 2011
Place of publication: Saint-Petersburg
Nanoimprint lithography patterned GaAs templates for site-controlled InAs quantum dots

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Tommila, J., Tukiainen, A., Viheriälä, J., Schramm, A., Hakkarainen, T., Aho, A., Stenberg, P., Dumitrescu, M., Guina, M.
Pages: 183-186
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Journal of Crystal Growth
Volume: 323
Issue number: 1
ISSN (Print): 0022-0248
Ratings:
Scopus rating (2016): SJR 0.735 SNIP 1.175 CiteScore 1.69
Scopus rating (2015): SJR 0.716 SNIP 1.174 CiteScore 1.63
Scopus rating (2014): SJR 0.795 SNIP 1.184 CiteScore 1.69
Scopus rating (2013): SJR 0.831 SNIP 1.221 CiteScore 1.78
Scopus rating (2012): SJR 0.956 SNIP 1.246 CiteScore 1.68
Scopus rating (2011): SJR 0.96 SNIP 1.425 CiteScore 1.89
Scopus rating (2010): SJR 1.163 SNIP 1.206
Scopus rating (2009): SJR 1.068 SNIP 1.202
Scopus rating (2008): SJR 1.161 SNIP 1.236
Scopus rating (2007): SJR 1.237 SNIP 1.32
Scopus rating (2006): SJR 1.001 SNIP 1.211
Scopus rating (2005): SJR 1.105 SNIP 1.403
Scopus rating (2004): SJR 1.211 SNIP 1.292
Scopus rating (2003): SJR 0.956 SNIP 1.11
Scopus rating (2002): SJR 1.16 SNIP 1.262
Scopus rating (2001): SJR 1.108 SNIP 1.067
Scopus rating (2000): SJR 1.044 SNIP 1.045
Scopus rating (1999): SJR 1.404 SNIP 1.003
Original language: English
DOIs:
10.1016/j.crysgro.2010.11.165

Bibliographical note
SA Projects NANOTOMO and DAUNTLESS
Source: researchoutputwizard
Source-ID: 7400
Research output: Scientific - peer-review › Article

Narrow-linewidth distributed feedback lasers with laterally-coupled ridge-waveguide surface gratings fabricated using nanoimprint lithography
General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Number of pages: 13
Publication date: 2011

Host publication information
Place of publication: Bellingham, WA
Publisher: SPIE
Editors: Belyanin, A. A., Smowton, P. M.
Article number: 79530B
ISBN (Print): 978-0-8194-8502-1

Publication series
Name: Photonics West Conference
Publisher: SPIE
Volume: 7953
ISSN (Print): 0277-786X
DOIs:
10.1117/12.875317

Bibliographical note
EU project DeLight, Tekes projects Nanophotonics Extension and Produla.S2 [7953-10].CD-ROM ja verkkojulkaisu.<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 5895
Research output: Scientific - peer-review › Conference contribution

Narrow linewidth laterally-coupled 1.55 µm DFB lasers fabricated using nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Telkkälä, J., Viheriälä, J., Aho, A., Melanen, P., Karinen, J., Dumitrescu, M., Guina, M.
Pages: 400-401
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Electronics Letters
Volume: 47
Issue number: 6
ISSN (Print): 0013-5194
Ratings:
Scopus rating (2016): SJR 0.442 SNIP 0.882 CiteScore 1.35
Scopus rating (2015): SJR 0.497 SNIP 1.011 CiteScore 1.31
Scopus rating (2014): SJR 0.522 SNIP 1.061 CiteScore 1.31
Scopus rating (2013): SJR 0.59 SNIP 1.155 CiteScore 1.45
Scopus rating (2012): SJR 0.631 SNIP 1.161 CiteScore 1.45
Scopus rating (2011): SJR 0.634 SNIP 1.098 CiteScore 1.44
Scopus rating (2010): SJR 0.637 SNIP 1.011
Scopus rating (2009): SJR 0.728 SNIP 1.072
Scopus rating (2008): SJR 0.843 SNIP 0.957
Scopus rating (2007): SJR 0.924 SNIP 1.169
Scopus rating (2006): SJR 0.863 SNIP 1.192
Optical properties of post-growth annealed type-II GaSb quantum dots

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Schramm, A., Polojärvi, V., Hakkarainen, T. V., Gubanov, A., Paajaste, J., Koskinen, R., Suomalainen, S., Guina, M.
Pages: 205-205
Publication date: 2011

Host publication information
Title of host publication: EURO MBE, 16th European Molecular Beam Epitaxy Workshop, March 20 - 23, 2011, Alpe d’Huez, France Alps
Place of publication: Alpe d’Huez
Publisher: Euro-MBE

Publication series
Name: European Molecular Beam Epitaxy Workshop EURO MBE
Publisher: Euro-MBE
Links:
http://embe2011.neel.cnrs.fr/

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7226
Research output: Scientific › Conference contribution

Optical properties of site-controlled single quantum dots

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Schramm, A., Sterlow, C., Tommila, J., Hakkarainen, T. V., Tukiainen, A., Dumitrescu, M., Kipp, T., Guina, M.
Pages: 97-97
Publication date: 2011

Host publication information
Title of host publication: OECS 12, Optics of Excitations in Confined Systems, September 12 - 16, 2011, Paris, France
Place of publication: Paris
Publisher: OECS12

Publication series
Optical properties of strain-free semiconductor quantum dots grown by refilling of self-assembled nanoholes

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Schramm, A., Polojärvi, V., Guina, M., Stemmann, A., Heyn, C.
Pages: 305-305
Publication date: 2011

Host publication information
Place of publication: Helsinki
Publisher: University of Helsinki
Editors: Dal Maso, M., Holmström, E.
ISBN (Print): 978-952-10-6872-0

Publication series
Name: Physics Days Annual Conference of the Finnish Physical Society and the Second Nordic Physics Meeting
Publisher: University of Helsinki
Volume: HU-P-D178
ISSN (Print): 0356-0961
Links:

Outcoupling of trapped optical modes in organic light-emitting devices with one-step fabricated periodic corrugation by laser ablation

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Bai, Y., Feng, J., Liu, Y., Song, J., Simonen, J., Jin, Y., Chen, Q., Zi, J., Sun, H.
Pages: 1927-1935
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Organic Electronics
Volume: 12
Issue number: 11
ISSN (Print): 1566-1199
Ratings:
Scopus rating (2016): CiteScore 3.4 SJR 1.068 SNIP 0.987
Scopus rating (2015): SJR 1.174 SNIP 1.134 CiteScore 3.6
Scopus rating (2014): SJR 1.36 SNIP 1.203 CiteScore 3.85
Scopus rating (2013): SJR 1.458 SNIP 1.277 CiteScore 3.94
Properties of the SiO2- and SiNx-capped GaAs(100) surfaces of GaInAsN / GaAs quantum-well heterostructures studied by photoelectron spectroscopy and photoluminescence

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Dahl, J., Polojärvi, V., Salmi, J., Laukkanen, P., Guina, M.
Number of pages: 3
Pages: 1-3
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: APPLIED PHYSICS LETTERS
Volume: 99
Issue number: 10
Article number: 102105
ISSN (Print): 0003-6951
Ratings:
Scopus rating (2016): CiteScore 2.67 SJR 1.132 SNIP 0.996
Scopus rating (2015): SJR 1.085 SNIP 0.983 CiteScore 2.47
Scopus rating (2014): SJR 1.799 SNIP 1.462 CiteScore 3.25
Scopus rating (2013): SJR 2.149 SNIP 1.652 CiteScore 3.77
Scopus rating (2012): SJR 2.554 SNIP 1.754 CiteScore 3.76
Scopus rating (2011): SJR 2.805 SNIP 1.94 CiteScore 4.04
Scopus rating (2010): SJR 2.926 SNIP 1.789
Scopus rating (2009): SJR 2.857 SNIP 1.848
Scopus rating (2008): SJR 2.934 SNIP 1.83
Scopus rating (2007): SJR 3.039 SNIP 1.913
Scopus rating (2006): SJR 3.457 SNIP 2.288
Scopus rating (2005): SJR 3.709 SNIP 2.382
Scopus rating (2004): SJR 3.904 SNIP 2.38
Scopus rating (2003): SJR 3.765 SNIP 2.27
Scopus rating (2002): SJR 3.917 SNIP 2.365
Scopus rating (2001): SJR 4.111 SNIP 2.212
Selective growth of GaAs nanostructures and subsequent guided self-assembly of InAs quantum dots on nanoimprint lithography patterned SiO2/GaAs substrates
Site-controlled InAs quantum dots by nanoimprint lithography and molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Schramm, A., Tommila, J., Sterlow, C., Kipp, T., Mews, A., Hakkarainen, T. V., Tukiainen, A., Dumitrescu, M., Guina, M.
Pages: 96-96
Publication date: 2011

Host publication information
Place of publication: Tallahassee, FL
Publisher: EP2DS

Publication series
Publisher: EP2DS

Site-controlled InAs quantum dots fabricated by UV-NIL and guided self-assembly

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Tommila, J. T., Schramm, A., Strelow, C., Kipp, T., Hakkarainen, T. V., Tukiainen, A., Dumitrescu, M., Guina, M.
Publication date: 2011

Host publication information
Title of host publication: Optics Days 2011, May 12 - 13, 2011, Oulu
Place of publication: Oulu
Publisher: Finnish Optical Society FOS

Publication series
Name: Optics Days
Publisher: Finnish Optical Society FOS

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 6585
Research output: Scientific › Conference contribution
Strain compensated 1120 nm GaInAs/GaAs vertical external-cavity surface-emitting laser grown by molecular beam epitaxy

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Ranta, S., Hakkarainen, T., Tavast, M., Lindfors, J., Leinonen, T., Guina, M.
Pages: 4-9
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Journal of Crystal Growth
Volume: 335
Issue number: 1
ISSN (Print): 0022-0248
Ratings:
Scopus rating (2016): SJR 0.735 SNIP 1.175 CiteScore 1.69
Scopus rating (2015): SJR 0.716 SNIP 1.174 CiteScore 1.63
Scopus rating (2014): SJR 0.795 SNIP 1.184 CiteScore 1.69
Scopus rating (2013): SJR 0.831 SNIP 1.221 CiteScore 1.78
Scopus rating (2012): SJR 0.956 SNIP 1.246 CiteScore 1.68
Scopus rating (2011): SJR 0.96 SNIP 1.425 CiteScore 1.89
Scopus rating (2010): SJR 1.163 SNIP 1.206
Scopus rating (2009): SJR 1.068 SNIP 1.202
Scopus rating (2008): SJR 1.161 SNIP 1.236
Scopus rating (2007): SJR 1.237 SNIP 1.32
Scopus rating (2006): SJR 1.001 SNIP 1.211
Scopus rating (2005): SJR 1.105 SNIP 1.403
Scopus rating (2004): SJR 1.211 SNIP 1.292
Scopus rating (2003): SJR 0.956 SNIP 1.11
Scopus rating (2002): SJR 1.16 SNIP 1.262
Scopus rating (2001): SJR 1.108 SNIP 1.067
Scopus rating (2000): SJR 1.044 SNIP 1.045
Scopus rating (1999): SJR 1.404 SNIP 1.003
Original language: English
DOIs:
10.1016/j.jcrysgro.2011.08.044

Bibliographical note
Project Arete<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7086
Research output: Scientific - peer-review › Article

Structural characterization of InAs quantum dot chains grown by molecular beam epitaxy on nanoimprint lithography patterned GaAs(100)

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Augmented Human Activities (AHA), Frontier Photonics
Authors: Hakkarainen, T. V., Tommila, J., Schramm, A., Tukiainen, A., Ahorinta, R., Dumitrescu, M., Guina, M.
Number of pages: 7
Pages: 1-7
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Nanotechnology
The Impact of Thermal Management of Saturable Absorber on the Performance of Mode-Locked Semiconductor Disk Lasers

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Rantamäki, A., Lyytikäinen, J., Nikkinen, J., Okhotnikov, O. G.
Number of pages: 1
Pages: 1-1
Publication date: 2011

Host publication information
Title of host publication: 2011 Conference on and 12th European Quantum Electronics Conference Lasers and Electro-Optics Europe CLEO EUROPE/EQEC, May 22 - 26, 2011, Munich, Germany
Place of publication: Washington, DC
Publisher: OSA

Publication series
Name: European Quantum Electronics Conference Lasers and Electro-Optics Europe CLEO EUROPE/EQEC
Publisher: OSA
DOIs:
10.1109/CLEOE.2011.5942640

Bibliographical note
Poster CB.P.31.Ei ut-numeroa 3.5.2014<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Three-grating monolithic phase-mask for the single-order writing of large-period gratings

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Frontier Photonics
Authors: Bourgin, Y., Vartiainen, I., Jourlin, Y., Kuitinen, M., Celle, F., Tonchev, S., Parriaux, O., Niemi, T.
Number of pages: 6
Pages: 1-6
Publication date: 2011
Peer-reviewed: Yes

Publication information
Journal: Journal of the European Optical Society - Rapid Publications
Volume: 6
Article number: 110165
ISSN (Print): 1990-2573
Ratings:
Scopus rating (2016): SJR 0.524 SNIP 0.603 CiteScore 1.34
Scopus rating (2015): SJR 0.565 SNIP 0.655 CiteScore 1.26
Scopus rating (2014): SJR 0.733 SNIP 0.935 CiteScore 1.42
Scopus rating (2013): SJR 0.468 SNIP 0.748 CiteScore 0.95
Scopus rating (2012): SJR 0.476 SNIP 0.569 CiteScore 0.71
Scopus rating (2011): SJR 0.564 SNIP 0.914 CiteScore 0.83
Scopus rating (2010): SJR 0.744 SNIP 0.751
Scopus rating (2009): SJR 0.455 SNIP 0.454
Scopus rating (2008): SJR 0.491 SNIP 0.632
Scopus rating (2007): SJR 0.317 SNIP 0.293
Original language: English
DOIs:
10.2971/jeos.2011.11016s

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 5794
Research output: Scientific - peer-review › Article

Vectorial Second Harmonic Generation Imaging of Gold Nanocones

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Department of Physics, Frontier Photonics
Authors: Bautista, G., Huttunen, M. J., Mäkitalo, J., Kontio, J. M., Simonen, J., Kauranen, M.
Number of pages: 1
Pages: 1-1
Publication date: 2011

Host publication information
Title of host publication: 2011 Conference on and 12th European Quantum Electronics Conference Lasers and Electro-Optics Europe CLEO EUROPE/EQEC, May 22 - 26, 2011, Munich, Germany
Place of publication: Washington, DC
Publisher: OSA

Publication series
Name: European Quantum Electronics Conference Lasers and Electro-Optics Europe CLEO EUROPE/EQEC
Publisher: OSA
1.38-µm mode-locked Raman fiber laser pumped by semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Chamorovskiy, A., Rantamäki, A., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O.
Pages: 23872-23877
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 18
Issue number: 23
ISSN (Print): 1094-4087
Ratings:
Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
Scopus rating (2003): SJR 2.688 SNIP 2.193
Scopus rating (2002): SJR 1.547 SNIP 1.673
Scopus rating (2001): SJR 1.442 SNIP 1.39
Scopus rating (2000): SJR 1.246 SNIP 0.714
Scopus rating (1999): SJR 1.381 SNIP 0.838
Original language: English
DOIs:
10.1364/OE.18.023872

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7794
Research output: Scientific - peer-review › Article

1.3-µm mode-locked disk laser with wafer fused gain and SESAM structures

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
1.3 µm mode-locked disk laser with wafer fused gain chip and SESAM
2.5 µm GaSb based semiconductor disk laser

**General information**
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Paajaste, J., Koskinen, R., Nikkinen, J., Okhotnikov, O. G., Suomalainen, S.
Number of pages: 3
Pages: 1-3
Publication date: 2010

**Host publication information**
Title of host publication: MBE 2010, 16th International Conference on Molecular Beam Epitaxy, Aug 22 - 27, 2010, Berlin, Germany

**Bibliographical note**
SA-project NanoPhotonics Extension. Poster, P2.07
Contribution: organisation=orc, FACT1=1
Source: researchoutputwizard
Source-ID: 9101
Research output: Scientific - peer-review › Conference contribution

2.5 W orange power by frequency conversion from dual-gain quantum-dot disk laser

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Rautiainen, J., Krestnikov, I., Nikkinen, J., Okhotnikov, O. G.
Pages: 1935-1937
Publication date: 2010
Peer-reviewed: Yes

**Publication information**
Journal: Optics Letters
Volume: 35
Issue number: 12
ISSN (Print): 0146-9592
Ratings:
Scopus rating (2016): SJR 1.864 SNIP 1.658 CiteScore 3.54
Scopus rating (2015): SJR 2.142 SNIP 1.642 CiteScore 3.53
Scopus rating (2014): SJR 2.497 SNIP 2.056 CiteScore 3.86
Scopus rating (2013): SJR 2.458 SNIP 2.095 CiteScore 3.95
Scopus rating (2012): SJR 2.596 SNIP 1.95 CiteScore 3.52
Scopus rating (2011): SJR 2.518 SNIP 2.475 CiteScore 3.69
Scopus rating (2010): SJR 2.669 SNIP 2.293
Scopus rating (2009): SJR 3.167 SNIP 2.665
Scopus rating (2008): SJR 3.408 SNIP 2.378
Scopus rating (2007): SJR 3.489 SNIP 2.102
Scopus rating (2006): SJR 3.143 SNIP 2.334
Scopus rating (2005): SJR 3.251 SNIP 2.483
Scopus rating (2004): SJR 3.521 SNIP 2.718
Scopus rating (2003): SJR 3.708 SNIP 2.573
Scopus rating (2002): SJR 3.702 SNIP 2.39
Scopus rating (2001): SJR 3.62 SNIP 2.244
Scopus rating (2000): SJR 3.416 SNIP 1.705
Scopus rating (1999): SJR 4.044 SNIP 1.699
3 W of 650 nm red emission by frequency doubling of wafer-fused semiconductor disk laser

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Rantamäki, A., Sirbu, A., Mereuta, A., Kapon, E., Okhotnikov, O. G.
Pages: 21645-21650
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 18
Issue number: 21
ISSN (Print): 1094-4087
Ratings:
Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
Scopus rating (2003): SJR 2.688 SNIP 2.193
Scopus rating (2002): SJR 1.547 SNIP 1.673
Scopus rating (2001): SJR 1.442 SNIP 1.39
Scopus rating (2000): SJR 1.246 SNIP 0.714
Scopus rating (1999): SJR 1.381 SNIP 0.838
Original language: English

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9079
Research output: Scientific - peer-review Article

894 nm distributed feedback laser diodes for atomic clock applications fabricated using nanoimprint lithography

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Telkkälä, J., Viheriälä, J., Laakso, A., Leinonen, K., Lyytikäinen, J., Karinen, J., Dumitrescu, M., Pessa, M.
Acidity sensor based on porphyrin self-assembled monolayers covalently attached to the surfaces of tapered fibres

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Department of Chemistry and Bioengineering, Research group: Supramolecular photochemistry
Authors: Veselov, A., Thur, C., Efimov, A., Guina, M., Lemmetyinen, H., Tkachenko, N.
Number of pages: 10
Pages: 1-10
Publication date: 2010
Peer-reviewed: Yes
Publication information
Journal: Measurement Science and Technology
Volume: 21
Issue number: 11, 115205
ISSN (Print): 0957-0233
Ratings:
Scopus rating (2016): CiteScore 1.75 SJR 0.668 SNIP 1.173
Scopus rating (2015): SJR 0.687 SNIP 1.303 CiteScore 1.71
Scopus rating (2014): SJR 0.657 SNIP 1.319 CiteScore 1.58
Scopus rating (2013): SJR 0.555 SNIP 1.244 CiteScore 1.53
Scopus rating (2012): SJR 0.716 SNIP 1.529 CiteScore 1.65
Scopus rating (2011): SJR 0.844 SNIP 1.703 CiteScore 1.77
Scopus rating (2010): SJR 0.679 SNIP 1.462
Scopus rating (2009): SJR 0.919 SNIP 1.573
Scopus rating (2008): SJR 0.881 SNIP 1.494
Scopus rating (2007): SJR 0.823 SNIP 1.492
Scopus rating (2006): SJR 0.744 SNIP 1.58
Scopus rating (2005): SJR 0.82 SNIP 1.584
Scopus rating (2004): SJR 0.828 SNIP 1.64
Scopus rating (2003): SJR 0.666 SNIP 1.199
Scopus rating (2002): SJR 0.589 SNIP 1.2
Scopus rating (2001): SJR 0.616 SNIP 1.548
Scopus rating (2000): SJR 0.79 SNIP 1.204
Scopus rating (1999): SJR 1.484 SNIP 0.905
Original language: English
DOIs:
10.1088/0957-0233/21/11/115205

Bibliographical note
Finnish Academy project ActiveFiber<br>Contribution: organisation=keb kem,FACT1=0.5<br>Contribution: organisation=orc,FACT2=0.5
Source: researchoutputwizard
Source-ID: 9550
Research output: Scientific - peer-review › Article
**AlInP nanostructures for solar cells antireflecion coatings**

**General information**
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Pages: 22
Publication date: 2010

**Host publication information**
Title of host publication: Optics Days 2010 Proceedings, May 6-7, 2010, Tampere, Finland
Editor: Reith, C.

**Bibliographical note**
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9018
Research output: Scientific › Conference contribution

**Arrays of metallic nanocones fabricated by UV-nanolmprint lithography**

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Kontio, J. M., Simonen, J., Tommila, J., Pessa, M.
Pages: 1711 - 1715
Publication date: 2010
Peer-reviewed: Yes

**Publication information**
Journal: Microelectronic Engineering
Volume: 87
Issue number: 9
ISSN (Print): 0167-9317
Ratings:
- Scopus rating (2016): SJR 0.606 SNIP 0.999 CiteScore 1.69
- Scopus rating (2015): SJR 0.533 SNIP 0.856 CiteScore 1.35
- Scopus rating (2014): SJR 0.592 SNIP 0.897 CiteScore 1.44
- Scopus rating (2013): SJR 0.602 SNIP 1.001 CiteScore 1.45
- Scopus rating (2012): SJR 0.745 SNIP 0.983 CiteScore 1.44
- Scopus rating (2011): SJR 0.818 SNIP 1.169 CiteScore 1.8
- Scopus rating (2010): SJR 0.946 SNIP 1.119
- Scopus rating (2009): SJR 0.847 SNIP 1.127
- Scopus rating (2008): SJR 1.05 SNIP 1.077
- Scopus rating (2007): SJR 1.065 SNIP 1.155
- Scopus rating (2006): SJR 0.979 SNIP 1.101
- Scopus rating (2005): SJR 0.96 SNIP 1.001
- Scopus rating (2004): SJR 0.99 SNIP 1.117
- Scopus rating (2003): SJR 0.814 SNIP 0.986
- Scopus rating (2002): SJR 0.726 SNIP 0.722
- Scopus rating (2001): SJR 0.552 SNIP 0.646
- Scopus rating (2000): SJR 0.748 SNIP 0.573
- Scopus rating (1999): SJR 0.654 SNIP 0.574
Original language: English
DOIs:
Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 8423
Research output: Scientific - peer-review › Article

Capacitance spectroscopy on self-assembled quantum dots

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Optoelectronics Research Centre
Authors: Schramm, A., Konetzni, C., Hansen, W.
Pages: 51-78
Publication date: 2010

Host publication information
Title of host publication: Quantum Materials, Nanoscience and technology
Editor: Heitmann, D.
ISBN (Print): 978-3-642-10552-4

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9246
Research output: Scientific - peer-review › Chapter

Cl2/N2-based plasma etching of high-aspect-ratio high-density nanopatterns in AlGaAs/GaAs, GaInAs/InP and AlGaAsSb/GaSb for nanophotonics applications

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Pages: 1p
Publication date: 2010

Host publication information
Title of host publication: MNE 2010 36th International Conference on Micro & Nano Engineering, Sep 19 - 22, 2010, Genoa, Italy

Bibliographical note
Poster P-NANO-100.<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9557
Research output: Scientific - peer-review › Conference contribution

Contactless electroreflectance study of band bending in be-doped GaInNAs/GaAs quantum wells: The origin of photoluminescence enhancement

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Number of pages: 3
Pages: 021902-1-3
Publication date: 2010
Peer-reviewed: Yes
DFB laser diodes fabricated using soft UV-nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Viheriälä, J., Telkkälä, J., Haring, K., Laakso, A., Leinonen, T., Koskinen, R., Leinonen, K., Dumitrescu, M., Guina, M.
Pages: p. 22
Publication date: 2010

Host publication information
Title of host publication: European Semiconductor Laser Workshop 2010, September 24 - 25, 2010, University of Pavia, Italy

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 8471
Research output: Scientific - peer-review › Article

Dislocation-induced electron and hole levels in InAs quantum-dot Schottky diodes

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Efficient GainNAs Gain mirrors for semiconductor disk lasers at 1.18 µm and 1.22 µm

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre, Research group: Semiconductor Technology and Applications
Authors: Korpijärvi, V., Puustinen, J., Leinonen, T., Rautiainen, J., Härkönen, A., Hakkarainen, T., Guina, M.
Pages: 196-199
Publication date: 2010

Host publication information

Publication series
Name: AIP Conference Proceedings
Volume: 1288
ISSN (Print): 0094-243X
DOIs: 10.1063/1.3521359

Bibliographical note
Project NATAL<br>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 8435
Research output: Scientific - peer-review › Conference contribution

Enemmän energiaa auringosta, eri aallonpituudet talteen

General information
State: Published
Ministry of Education publication type: B1 Article in a scientific magazine
Organisations: Optoelectronics Research Centre
Authors: Savolainen, P., Luukko, T.
Pages: 35-37
Publication date: 2010
Peer-reviewed: No

Publication information
Journal: Prosessori
Volume: 32
Issue number: 11
Original language: Finnish

Bibliographical note
Lehti ja digilehti<br>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9242
Research output: Scientific › Article

Experimental approaches to guided self-assembly of InAs quantum dots on nanoinprint lithography patterned GaAs surfaces

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Pages: 23
Fabrication of GaSb-based distributed feedback laser by nanoimprint lithography

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Suomalainen, S., Haring, K., Viheriälä, J., Viljanen, M., Paajaste, J., Koskinen, R., Laakso, A., Leinonen, K., Niemi, T., Guina, M.
Pages: 172
Publication date: 2010

Host publication information
Title of host publication: Optics Days 2010 Proceedings, May 6-7, 2010, Tampere, Finland
Editor: Reith, C.

Few-femtosecond plasmon dephasing of a single metallic nanostructure from optical response function reconstruction by interferometric frequency resolved optical gating

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Anderson, A., Deryckx, K. S., Xu, X. G., Steinmeyer, G., Raschke, M. B.
Pages: 2519-2524
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Nano Letters
Volume: 10
ISSN (Print): 1530-6984
Ratings:
Scopus rating (2016): CiteScore 13.4 SJR 7.983 SNIP 2.881
Scopus rating (2015): SJR 8.62 SNIP 3.353 CiteScore 14.76
Scopus rating (2013): SJR 9.085 SNIP 3.41 CiteScore 14.23
Scopus rating (2012): SJR 10.253 SNIP 3.615 CiteScore 13.78
Scopus rating (2010): SJR 9.32 SNIP 3.282
Scopus rating (2009): SJR 7.868 SNIP 2.891
Scopus rating (2008): SJR 7.649 SNIP 2.991
Scopus rating (2007): SJR 6.983 SNIP 2.954
GaSb-based distributed feedback laser fabricated by nanoimprint lithography

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Suomalainen, S., Haring, K., Viheriälä, J., Viljanen, M., Paajaste, J., Koskinen, R., Laakso, A., Leinonen, K., Niemi, T., Guina, M.
Pages: 22-23
Publication date: 2010

Host publication information
Title of host publication: MIRSENS International Workshop on Opportunities and Challenges in Mid-Infrared Laser-Based Gas Sensing, Wroclaw University of Technology, May 6-8, 2010, Wroclaw, Poland

GaSb-based heterostructures for high power and pulsed laser operation

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Paajaste, J., Suomalainen, S., Koskinen, R., Härkönen, A., Kivistö, S., Guina, M., Okhotnikov, O. G., Pessa, M.
Pages: 41-46
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Lithuanian Journal of Physics
Volume: 50
Issue number: 1
ISSN (Print): 1648-8504
Ratings:
Scopus rating (2016): SJR 0.194 SNIP 0.406 CiteScore 0.54
Scopus rating (2015): SJR 0.301 SNIP 0.452 CiteScore 0.62
Scopus rating (2014): SJR 0.279 SNIP 0.555 CiteScore 0.62
Scopus rating (2013): SJR 0.388 SNIP 0.434 CiteScore 0.65
Scopus rating (2012): SJR 0.252 SNIP 0.273 CiteScore 0.47
Scopus rating (2011): SJR 0.179 SNIP 0.275 CiteScore 0.38
Scopus rating (2010): SJR 0.14 SNIP 0.201
Scopus rating (2009): SJR 0.15 SNIP 0.094
Original language: English
DOIs:
GaSb-based vertical-cavity heterostructures for high power and pulsed mid-infrared disk lasers

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Suomalainen, S., Paajaste, J., Koskinen, R., Nikkinen, J., Alanko, J., Härkönen, A., Guina, M.
Pages: 60
Publication date: 2010

Host publication information
Title of host publication: 10th International Conference on Mid-Infrared Optoelectronics: Materials and Devices, Shanghai, China, September 5-9, 2010

Growth studies of self-assembled InAs quantum dots on patterned substrates

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Pages: 246
Publication date: 2010

Host publication information
Editors: Sajavaara, T., Maasilta, I., Mättö, L., Julin, J., Rahkila, P.

Large-area nanoperforated SiN membranes for optical and mechanical filtering

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Viheriälä, J., Niemi, T., Laukkanen, J., Karjalainen, M., Pessa, M.
Pages: 1620 - 1622
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Microelectronic Engineering
Volume: 87
Laterally-coupled distributed feedback InGaSb/GaSb diode lasers fabricated by nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Haring, K., Viheriälä, J., Viljanen, M., Paajaste, J., Koskinen, R., Suomalainen, S., Laakso, A., Leinonen, K., Niemi, T., Guina, M.
Pages: 1146-1147
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Electronics Letters
Volume: 46
Issue number: 16
ISSN (Print): 0013-5194
Ratings:
Scopus rating (2016): SJR 0.442 SNIP 0.882 CiteScore 1.35
Scopus rating (2015): SJR 0.497 SNIP 1.011 CiteScore 1.31
Scopus rating (2014): SJR 0.522 SNIP 1.061 CiteScore 1.31
Scopus rating (2013): SJR 0.59 SNIP 1.155 CiteScore 1.45
Scopus rating (2012): SJR 0.631 SNIP 1.161 CiteScore 1.45
Scopus rating (2011): SJR 0.634 SNIP 1.098 CiteScore 1.44
Scopus rating (2010): SJR 0.637 SNIP 1.011
Scopus rating (2009): SJR 0.728 SNIP 1.072
Scopus rating (2008): SJR 0.843 SNIP 0.957
Lateral ordering of InAs quantum dots on cross-hatch patterned GaInP

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Hakkarainen, T., Schramm, A., Tukiainen, A., Ahorinta, R., Toikkanen, L., Guina, M.
Pages: 1892-1896
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Nanoscale Research Letters
Volume: 5
Issue number: 12
ISSN (Print): 1931-7573
Ratings:
Scopus rating (2016): SJR 0.589 SNIP 0.746 CiteScore 2.15
Scopus rating (2015): SJR 0.538 SNIP 0.653 CiteScore 1.69
Scopus rating (2014): SJR 0.748 SNIP 1.019 CiteScore 2.15
Scopus rating (2013): SJR 0.79 SNIP 0.967 CiteScore 2.23
Scopus rating (2012): SJR 1.049 SNIP 1.073 CiteScore 2.58
Scopus rating (2011): SJR 1.04 SNIP 1.124 CiteScore 2.88
Scopus rating (2010): SJR 1.062 SNIP 1.007
Scopus rating (2009): SJR 1.063 SNIP 1.01
Scopus rating (2008): SJR 0.828 SNIP 0.632
Scopus rating (2007): SJR 1.458 SNIP 0.71
Original language: English
DOIs:
10.1007/s11671-010-9747-2

Bibliographical note
Special issue article.SA project DAUNTLESS.<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7985
Research output: Scientific - peer-review › Article

Lateral ordering of self-assembled InAs quantum dots on strained GaInP

General information
State: Published
Mode coupling of microstructured optical fibers using temperature-dependent nitrogen-doped quartz fibers
Molecular beam epitaxy and annealing of 1 eV GaInNAs for high-efficiency multi-junction solar cells

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Aho, A., Korpijärvi, V., Tukiainen, A., Polojärvi, V., Guina, M., Pessa, M.
Pages: p. 234
Publication date: 2010

Host publication information
Editors: Sajavaara, T., Maasilta, I., Mättö, L., Julin, J., Rahkila, P.

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 7624
Research output: Scientific › Conference contribution

Nanoimprint lithography - Next generation nanopatterning methods for nanophotonics fabrication

General information
State: Published
Ministry of Education publication type: A3 Part of a book or another research book
Organisations: Optoelectronics Research Centre
Authors: Viheriälä, J., Niemi, T., Kontio, J., Pessa, M.
Pages: 275 - 298
Publication date: 2010

Host publication information
Title of host publication: Recent Optical and Photonic Technologies
Place of publication: Croatia
Publisher: InTech
Editor: Kim, K. Y.
ISBN (Print): 978-953-7619-71-8

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9555
Research output: Scientific › Conference contribution

Nanoperforated silicon membranes fabricated by UV-nanoimprint lithography, deep reactive ion etching and atomic layer deposition

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Sainiemi, L., Viheriälä, J., Sikanen, T., Laukkanen, J., Niemi, T.
Number of pages: 8
Pages: 1-8
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Micromechanics and Microengineering
Volume: 20
Issue number: 7, 077001
Nanostructured broadband antireflection coatings on AlInP fabricated by nanoimprint lithography

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Pages: 1845-1848
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Solar Energy Materials and Solar Cells
Volume: 94
ISSN (Print): 0927-0248
Ratings:
Scopus rating (2016): CiteScore 4.97 SJR 1.587 SNIP 1.71
Scopus rating (2015): SJR 1.869 SNIP 1.896 CiteScore 5.16
Scopus rating (2014): SJR 2.204 SNIP 2.396 CiteScore 5.87
Scopus rating (2013): SJR 2.174 SNIP 2.582 CiteScore 5.58
Scopus rating (2012): SJR 2.435 SNIP 2.707 CiteScore 5.25
Scopus rating (2011): SJR 2.175 SNIP 2.638 CiteScore 5.16
Scopus rating (2010): SJR 2.524 SNIP 2.121
Scopus rating (2009): SJR 1.991 SNIP 1.977
Scopus rating (2008): SJR 1.654 SNIP 1.458
Scopus rating (2007): SJR 1.359 SNIP 1.488
Scopus rating (2006): SJR 1.447 SNIP 1.799
Passively mode locked semiconductor disk laser using multiple gain elements

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Rantamäki, A., Saarinen, E., Lyytikäinen, J., Okhotnikov, O. G.
Pages: p. 68
Publication date: 2010

Host publication information
Title of host publication: Optics Days 2010 Proceedings, May 6-7, 2010, Tampere, Finland
Editor: Reith, C.

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9419
Research output: Scientific › Article

Protective coating for nanoimprint template deposited using atomic layer deposition

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Optoelectronics Research Centre
Authors: Viheriälä, J., Tommila, J., Viljanen, M., Alasaarela, T., Niemi, T.
Pages: 1 p
Publication date: 2010

Host publication information
Title of host publication: MNE 2010 36th International Conference on Micro & Nano Engineering, Sep 19 - 22, 2010, Genoa, Italy

Bibliographical note
Oral session, O-LITH-11<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 9558
Research output: Scientific › Conference contribution

Self-assembled monolayers (SAMs) of porphyrin deposited inside hollow-core photonic bandgap fiber (HCPBGF)

General information
State: Published
Sub wavelength nanostructures for broad band solar cells anti-reflection coatings

Tip-enhanced Raman scattering from bridged nanocones

Tip-enhanced Raman scattering from bridged nanocones

We present two silver nanocones separated by 450 nm, well beyond the typical gap spacing of coupled nanoantennas, and connected by a metal bridge to facilitate plasmonic coupling between them. The tip-enhanced Raman scattering from crystal violet molecules is found to be almost an order of magnitude higher from the bridged cones than from individual cones. This result is supported by local-field calculations of the two types of structures. The bridged nanocones are easily fabricated by a nanoimprint-based process, thus offering a faster and simpler approach compared to other fabrication techniques.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre, Department of Physics
Authors: Rao, S., Huttunen, M. J., Kontio, J. M., Määttö, J., Viljanen, M., Simonen, J., Kauranen, M., Petrov, D.
Pages: 23790-23795
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Optics Express
Volume: 18
Issue number: 23
ISSN (Print): 1094-4087
Ratings:
Scopus rating (2016): CiteScore 3.48 SJR 1.487 SNIP 1.589
Scopus rating (2015): SJR 1.976 SNIP 1.755 CiteScore 3.78
Scopus rating (2014): SJR 2.349 SNIP 2.166 CiteScore 4.18
Scopus rating (2013): SJR 2.358 SNIP 2.226 CiteScore 4.38
Scopus rating (2012): SJR 2.587 SNIP 2.145 CiteScore 3.85
Scopus rating (2011): SJR 2.579 SNIP 2.606 CiteScore 4.04
Scopus rating (2010): SJR 2.943 SNIP 2.466
Scopus rating (2009): SJR 3.092 SNIP 2.669
Scopus rating (2008): SJR 3.195 SNIP 2.393
Scopus rating (2007): SJR 3.27 SNIP 2.032
Scopus rating (2006): SJR 3.233 SNIP 2.326
Scopus rating (2005): SJR 3.334 SNIP 2.379
Scopus rating (2004): SJR 2.833 SNIP 2.499
Scopus rating (2003): SJR 2.688 SNIP 2.193
Scopus rating (2002): SJR 1.547 SNIP 1.673
Scopus rating (2001): SJR 1.442 SNIP 1.39
Scopus rating (2000): SJR 1.246 SNIP 0.714
Scopus rating (1999): SJR 1.381 SNIP 0.838
Original language: English
Electronic versions:
rao_tip-enhanced_raman_scattering.pdf
DOIs:
10.1364/OE.18.023790
Links:
http://urn.fi/URN:NBN:fi:tty-201103311104

Bibliographical note
SA projects A-PLAN and REDMETA, TEKES project NanoExtension<br>
Contribution: organisation=fys,FACT1=0.5<br>
Contribution: organisation=orc,FACT2=0.5
Source: researchoutputwizard
Source-ID: 9086
Research output: Scientific - peer-review › Article

Small hydrogen-like centers and excitons in structures with single quantum wells

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Former organisation of the author
Authors: Gubanov, A., Glinskii, G.
Pages: 62-66
Publication date: 2009
Peer-reviewed: Yes

Publication information
Journal: Bulletin of Saint Petersburg State University, Physics and Mathematics Series
Volume: 83
Issue number: 3
Original language: English

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 10022
Research output: Scientific - peer-review › Article

Impact of an air barrier on the electron states of etch-released quantum heterostructures

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Optimization studies of single-transverse-mode 980 nm ridge-waveguide lasers

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Laakso, A., Dumitrescu, M., Pietilä, P., Suominen, M., Pessa, M.
Pages: 853-861
Publication date: 2008
Peer-reviewed: Yes

Publication information
Journal: Optical and Quantum Electronics
Volume: 40
Issue number: 11-12
ISSN (Print): 0306-8919
Ratings:
Scopus rating (2016): CiteScore 1.02 SJR 0.321 SNIP 0.629
Scopus rating (2015): SJR 0.392 SNIP 0.668 CiteScore 1.05
Scopus rating (2014): SJR 0.373 SNIP 0.591 CiteScore 0.98
Scopus rating (2013): SJR 0.547 SNIP 0.861 CiteScore 1.29
Scopus rating (2012): SJR 0.473 SNIP 0.787 CiteScore 0.95
Scopus rating (2011): SJR 0.463 SNIP 0.617 CiteScore 0.77
Scopus rating (2010): SJR 0.439 SNIP 0.517
Scopus rating (2009): SJR 0.688 SNIP 0.645
Scopus rating (2008): SJR 0.562 SNIP 0.646
Scopus rating (2007): SJR 0.66 SNIP 0.654
Scopus rating (2006): SJR 0.558 SNIP 0.549
Scopus rating (2005): SJR 0.754 SNIP 0.695
Scopus rating (2004): SJR 0.87 SNIP 0.87
Scopus rating (2003): SJR 0.871 SNIP 0.717
Scopus rating (2002): SJR 0.679 SNIP 0.705
Scopus rating (2001): SJR 0.691 SNIP 0.608
Scopus rating (2000): SJR 0.682 SNIP 0.579
Scopus rating (1999): SJR 1.175 SNIP 0.759
Original language: English
DOIs:
10.1007/s11082-009-9280-7

Bibliographical note
EU projekt DeLight<br>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 12713
**Short-wavelength GaInNAs/GaAs semiconductor disk lasers**

**General information**
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Optoelectronics Research Centre
Authors: Vetter, S., Hastie, J., Korpijärvi, V., Puustinen, J., Guina, M., Okhotnikov, O., Calvez, S., Dawson, M.
Pages: 1069-1070
Publication date: 2008
Peer-reviewed: Yes

**Publication information**
Journal: Electronics Letters
Volume: 44
Issue number: 18
ISSN (Print): 0013-5194
Ratings:
Scopus rating (2016): SJR 0.442 SNIP 0.882 CiteScore 1.35
Scopus rating (2015): SJR 0.497 SNIP 1.011 CiteScore 1.31
Scopus rating (2014): SJR 0.522 SNIP 1.061 CiteScore 1.31
Scopus rating (2013): SJR 0.59 SNIP 1.155 CiteScore 1.45
Scopus rating (2012): SJR 0.631 SNIP 1.161 CiteScore 1.45
Scopus rating (2011): SJR 0.634 SNIP 1.098 CiteScore 1.44
Scopus rating (2010): SJR 0.637 SNIP 1.011
Scopus rating (2009): SJR 0.728 SNIP 1.072
Scopus rating (2008): SJR 0.843 SNIP 0.957
Scopus rating (2007): SJR 0.924 SNIP 1.169
Scopus rating (2006): SJR 0.863 SNIP 1.192
Scopus rating (2005): SJR 1.048 SNIP 1.298
Scopus rating (2004): SJR 1.156 SNIP 1.354
Scopus rating (2003): SJR 1.372 SNIP 1.352
Scopus rating (2002): SJR 1.572 SNIP 1.202
Scopus rating (2001): SJR 1.591 SNIP 1.042
Scopus rating (2000): SJR 1.264 SNIP 0.951
Scopus rating (1999): SJR 1.443 SNIP 1.074
Original language: English
DOI:
10.1049/el:20081488

**Bibliographical note**
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 13749
Research output: Scientific - peer-review › Article

**Color-tunable electroluminescence from white organic light-emitting devices with a metal-insulator-metal cathode**

**General information**
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Okamoto, T., Kawata, S., Feng, J., Simonen, J.
Pages: 121
Publication date: 2007

**Host publication information**
Title of host publication: SPP3, Third International Conference on Surface Plasmon Photonics, Dijon, France, June 17-22, 2007
Losses of surface plasmons in thin corrugated silver films

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Simonen, J., Okamoto, T., H'Dhili, F., Kawata, S., Pessa, M.
Pages: p. 75
Publication date: 2007

Host publication information
Title of host publication: Nanotech Northern Europe 2007, Helsinki, Finland

Plasmon propagation losses on the edges of band gaps

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Optoelectronics Research Centre
Authors: Simonen, J., Pessa, M., Okamoto, T., Kawata, S., H'Dhili, F.
Pages: p. 253
Publication date: 2007

Host publication information
Title of host publication: SPP3, Third International Conference on Surface Plasmon Photonics, Dijon, France, June 17-22, 2007

Surface Plasmon enhanced emissive devices

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Former organisation of the author
Authors: Simonen, J.
Pages: p. 32
Publication date: 2007

Host publication information
Title of host publication: Nanotech Northern Europe 2007, March 27 - 29, Helsinki, Finland
Constant Capacitance-DLTS on InAs-Quantum Dots embedded in Schottkydiodes

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Former organisation of the author
Authors: Schramm, A., Schaefer, J., Schulz, S., Hansen, W.
Publication date: 2006

Host publication information
Title of host publication: 28th International Conference on the Physics of Semiconductors, July 24 - 28, 2006, Vienna, Austria

Bibliographical note
WeA2k.58<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 17587
Research output: Scientific - peer-review › Conference contribution

Tunneling Transient Spectroscopy on self-assembled InAs Quantum Dots

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Former organisation of the author
Authors: Schramm, A.
Publication date: 2006

Host publication information
Title of host publication: 28th International Conference on the Physics of Semiconductors, July 24 - 28, 2006, Vienna, Austria

Bibliographical note
WeA1b.3<br/>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 17585
Research output: Scientific - peer-review › Conference contribution

CW and pulsed operation of a diode-pumped Bessel-Gauss laser

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Former organisation of the author
Authors: Hakola, A., Butchter, S., Kajava, T., Elfström, H., Simonen, J., Pääkkönen, P., Turunen, J.
Pages: p. 37
Publication date: 2005

Host publication information
Title of host publication: IEEE Conference on Lasers and Electro-Optics Europe, 2005. CLEO/Europe
ISBN (Print): 0-7803-8974-3
DOIs: 10.1109/CLEOE.2005.1567826

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 18296
Research output: Scientific - peer-review › Conference contribution

High power, continuous wave operation of a vertical external cavity surface emitting Laser at 674nm
Plasmonic band gap engineering for lasing applications

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Former organisation of the author
Authors: Simonen, J., Okamoto, T., H'Dhili, F., Kawata, S.
Pages: 220-221
Publication date: 2005

Host publication information
Title of host publication: Proceedings of Microoptics Conference, Tokyo, Japan, 2005

Bibliographical note
H52<br>Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 19584
Research output: Scientific › Conference contribution

Plasmonic band gap engineering for lasing applications

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Former organisation of the author
Authors: Simonen, J., Okamoto, T., H'Dhili, F., Kawata, S.
Pages: 27-28
Publication date: 2005

Host publication information
Title of host publication: Proceedings of the Sixth Japan-Finland Joint Symposium on Optics in Engineering (OIE’05), Sapparo, Japan, 26-28.9.2005

Bibliographical note
Contribution: organisation=orc,FACT1=1
Source: researchoutputwizard
Source-ID: 19583
Research output: Scientific › Conference contribution

Plasmonic nanostructures for lasing applications

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Former organisation of the author
Authors: Simonen, J., Okamoto, T., H'Dhili, F., Feng, J., Kawata, S.
Pages: p. 48