Finding H2SO4-H2O nucleation rates in high H2SO4 concentrations

General information
State: Published
Ministry of Education publication type: B3 Non-refereed article in conference proceedings
Organisations: Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Authors: Olin, M., Kausiala, O., Alanen, J., Rönkkö, T., Dal Maso, M.
Number of pages: 4
Pages: 476-479
Publication date: 2017

Host publication information
Title of host publication: Proceedings of the 20th International Conference on Nucleation and Atmospheric Aerosols
Publisher: Aerosolitutkimusseura r.y., Finnish Association for Aerosol Research c/o University of Helsinki, Department of Physics
ISBN (Print): 978-952-7091-84-5

Publication series
Name: Report Series in Aerosol Science
Publisher: Aerosolitutkimusseura r.y.
No.: 200
ISSN (Electronic): 0784-3496
ASJC Scopus subject areas: Pollution

Bibliographical note
INT="Kausiala, O."
Research output: Scientific › Conference contribution

On-road measurements of primary and secondary aerosol on European highways from the Baltic Sea to the Mediterranean

General information
State: Published
Organisations: Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group, Tampere Univ Technol, Tampere University of Technology
Publication date: 2017
Peer-reviewed: Unknown
Research output: Scientific › Paper, poster or abstract

Sensitivity analysis of a model characterizing nanoparticle agglomeration, dispersion and deposition processes in the atmosphere

General information
State: Published
Organisations: Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group, Research group: Aerosol Synthesis
Authors: Poikkimäki, M., Juuti, P., Kalliokoski, J., Dal Maso, M.
Publication date: 2017
Peer-reviewed: Unknown
Research output: Scientific › Paper, poster or abstract

Sensitivity analysis of a model characterizing nanoparticle agglomeration, dispersion and deposition processes in the atmosphere
Abstract T104N388
Particle charge-size distribution measurement using a differential mobility analyzer and an electrical low pressure impactor

General information
State: E-pub ahead of print
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Authors: Järvinen, A., Heikkilä, P., Keskinen, J., Yli-Ojanperä, J.
Pages: 1-10
Publication date: 2 Nov 2016
Peer-reviewed: Yes

Publication Information
Journal: Aerosol Science and Technology
ISSN (Print): 0278-6826
Ratings:
Scopus rating (2016): CiteScore 1.88 SJR 0.943 SNIP 0.853
Scopus rating (2015): SJR 1.284 SNIP 1.009 CiteScore 2.42
Scopus rating (2014): SJR 1.365 SNIP 1.099 CiteScore 2.74
Scopus rating (2013): SJR 1.521 SNIP 1.514 CiteScore 2.94
Scopus rating (2012): SJR 1.408 SNIP 1.038 CiteScore 2.58
Scopus rating (2011): SJR 1.137 SNIP 0.927 CiteScore 2.51
Scopus rating (2010): SJR 1.132 SNIP 0.742
Scopus rating (2009): SJR 1.568 SNIP 0.871
Scopus rating (2008): SJR 1.813 SNIP 1.106
Scopus rating (2007): SJR 1.99 SNIP 1.189
Scopus rating (2006): SJR 1.638 SNIP 1.197
Scopus rating (2005): SJR 1.234 SNIP 0.93
Scopus rating (2004): SJR 1.825 SNIP 1.447
Scopus rating (2003): SJR 1.935 SNIP 1.243
Scopus rating (2002): SJR 1.923 SNIP 1.246
Scopus rating (2001): SJR 1.193 SNIP 1.318
Scopus rating (2000): SJR 1.328 SNIP 1.441
Scopus rating (1999): SJR 1.344 SNIP 0.926
Original language: English
DOIs:
10.1080/02786826.2016.1256469
Research output: Scientific › Article

Exhaust particle and NOx emission performance of an SCR heavy duty truck operating in real-world conditions

Particle and NOx emissions of an SCR equipped HDD truck were studied in real-world driving conditions using the "Sniffer" mobile laboratory. Real-time CO2 measurement enables emission factor calculation for NOx and particles. In this study, we compared three different emission factor calculation methods and characterised their suitability for real-world chasing experiments. The particle number emission was bimodal and dominated by the nucleation mode particles (diameter below 23 nm) having emission factor up to $1 \times 10^{15} \text{#/kg}_{\text{fuel}}$, whereas emission factor for soot (diameter above 23 nm that is consistent with the PMP standard) was typically $1 \times 10^{14} \text{#/kg}_{\text{fuel}}$. The effect of thermodenuder on the exhaust particles indicated that the nucleation particles consisted mainly of volatile compounds, but sometimes there also existed a non-volatile core. The nucleation mode particles are not controlled by current regulations in Europe. However, these particles consistently form under atmospheric dilution in the plume of the truck and constitute a health risk for the...
The on-road emission performance of the vehicle was very close to the expected levels, confirming the successful operation of the SCR system of the tested vehicle. Heavy driving conditions such as uphill driving increased both the NO\(_x\) and particle number emission factors whereas the emission factor for soot particle number remains rather constant.

**General information**

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group, Laboratory of Applied Thermodynamics, Aristotle University of Thessaloniki, University of Helsinki, Dinex Ecocat Oy
Authors: Saari, S., Karjalainen, P., Ntziachristos, L., Pirjola, L., Matilainen, P., Keskinen, J., Rönkkö, T.
Pages: 136-144
Publication date: 2016
Peer-reviewed: Yes
Early online date: 2 Dec 2015

**Publication information**

Journal: Atmospheric Environment
Volume: 126
ISSN (Print): 1352-2310
Ratings:
- Scopus rating (2016): CiteScore 4.01 SJR 1.466 SNIP 1.593
- Scopus rating (2015): SJR 1.759 SNIP 1.597 CiteScore 3.73
- Scopus rating (2014): SJR 1.593 SNIP 1.67 CiteScore 3.55
- Scopus rating (2013): SJR 1.753 SNIP 1.63 CiteScore 3.52
- Scopus rating (2012): SJR 1.968 SNIP 1.699 CiteScore 3.47
- Scopus rating (2011): SJR 1.982 SNIP 1.78 CiteScore 3.84
- Scopus rating (2010): SJR 1.894 SNIP 1.489
- Scopus rating (2009): SJR 1.945 SNIP 1.466
- Scopus rating (2008): SJR 1.866 SNIP 1.594
- Scopus rating (2007): SJR 1.961 SNIP 1.56
- Scopus rating (2006): SJR 1.874 SNIP 1.587
- Scopus rating (2005): SJR 1.893 SNIP 1.6
- Scopus rating (2004): SJR 1.969 SNIP 1.779
- Scopus rating (2003): SJR 1.946 SNIP 1.607
- Scopus rating (2002): SJR 2.027 SNIP 1.611
- Scopus rating (2001): SJR 1.947 SNIP 1.705
- Scopus rating (2000): SJR 1.898 SNIP 1.621
- Scopus rating (1999): SJR 2.046 SNIP 1.407
Original language: English
ASJC Scopus subject areas: Atmospheric Science, Environmental Science(all)
Keywords: Emission factor, Nucleation mode, Particle number, Selective catalytic reduction, Volatile compound
DOIs: 10.1016/j.atmosenv.2015.11.047
Source: Scopus
Source-ID: 84949921381
Research output: Scientific - peer-review » Article

**Measurement of aerosol charge distributions**

**General information**

State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics, Research area: Optics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Authors: Järvinen, A., Heikkilä, P., Keskinen, J., Yli-Ojanperä, J.
Publication date: 2016

**Host publication information**
Particle emission from loaders using normal and bio based diesel fuels

General information
State: Published
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group, Neste Oil Oyj, VTT Tech Res Ctr Finland, VTT Technical Research Center Finland
Authors: Järvinen, A. R., Wihersaari, H., Karjalainen, P. A., Nuottimäki, J., Kytö, M., Keskinen, J. O., Rönkkö, T. S.
Publication date: 2016
Peer-reviewed: Unknown
Event:
Links:
Research output: Professional › Paper, poster or abstract

The formation and physical properties of the particle emissions from a natural gas engine

Natural gas engine particle emissions were studied using an old gasoline engine modified to run with natural gas. The tests were steady-state tests performed on two different low loads in an engine dynamometer. Exhaust particle number concentration, size distribution, volatility and electric charge were measured. Exhaust particles were observed to have peak diameters below 10 nm. To get the full picture of particle emissions from natural gas engines, size range 1-5 nm is relevant and important to take into consideration. A particle size magnifier (PSM) was used in this engine application for measuring particles smaller than 3 nm and it proved to be a useful instrument when measuring natural gas engine exhaust particles. It is concluded that the detected particles probably originated from the engine cylinders or their vicinity and grew to detectable sizes in the sampling process because a small fraction of the particles were observed to carry electric charge and the particles did not evaporate totally at 265°C.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group, Engineering materials science and solutions (EMASS), Urban circular bioeconomy (UrCirBio), Atmospheric Composition Research, VTT Technical Research Centre of Finland, Finnish Meteorological Institute
Authors: Alanen, J., Saukko, E., Lehtoranta, K., Murtonen, T., Timonen, H., Hillamo, R., Karjalainen, P., Kuuluvainen, H., Harra, J., Keskinen, J., Rönkkö, T.
Number of pages: 7
Pages: 155-161
Publication date: 15 Dec 2015
Peer-reviewed: Yes

Publication information
Journal: Fuel
Volume: 162
ISSN (Print): 0016-2361
Ratings:
Scopus rating (2016): CiteScore 4.9 SJR 1.744 SNIP 2.179
Scopus rating (2015): SJR 1.809 SNIP 2.125 CiteScore 4.46
Scopus rating (2014): SJR 1.667 SNIP 2.331 CiteScore 4.14
Scopus rating (2013): SJR 1.811 SNIP 2.595 CiteScore 4.31
Scopus rating (2012): SJR 1.852 SNIP 2.465 CiteScore 3.99
Scopus rating (2011): SJR 2.093 SNIP 2.427 CiteScore 4.1
Scopus rating (2010): SJR 1.984 SNIP 2.319
Scopus rating (2009): SJR 2.012 SNIP 2.277
Scopus rating (2008): SJR 1.635 SNIP 2.184
Scopus rating (2007): SJR 1.383 SNIP 1.86
Scopus rating (2006): SJR 1.278 SNIP 1.64
Scopus rating (2005): SJR 1.623 SNIP 1.73
Time-resolved characterization of primary and secondary particle emissions of a modern gasoline passenger car

Changes in traffic systems and vehicle emission reduction technologies significantly affect traffic-related emissions in urban areas. In many densely populated areas the amount of traffic is increasing, keeping the emission level high or even increasing. To understand the health effects of traffic related emissions, both primary and secondary particles that are formed in the atmosphere from gaseous exhaust emissions need to be characterized. In this study we used a comprehensive set of measurements to characterize both primary and secondary particulate emissions of a modern gasoline passenger car. Our aerosol particle study covers the whole process chain in emission formation, from the engine to the atmosphere, and takes into account also differences in driving patterns. We observed that in mass terms, the amount of secondary particles was 13 times higher than the amount of primary particles. The formation, composition, number, and mass of secondary particles was significantly affected by driving patterns and engine conditions. The highest gaseous and particulate emissions were observed at the beginning of the test cycle when the performance of the engine and the catalyst was below optimal. The key parameter for secondary particle formation was the amount of gaseous hydrocarbons in primary emissions; however, also the primary particle population had an influence. Thus, in order to enhance human health and wellbeing in urban areas, our study strongly indicates that in future legislation, special attention should be directed into the reduction of gaseous hydrocarbons.

Characterization of trace metals on soot aerosol particles with the SP-AMS: Detection and quantification

A method to detect and quantify mass concentrations of trace metals on soot particles by the Aerodyne soot-particle aerosol mass spectrometer (SP-AMS) was developed and evaluated in this study. The generation of monodisperse Regal black (RB) test particles with trace amounts of 13 different metals (Na, Al, Ca, V, Cr, Mn, Fe, Ni, Cu, Zn, Rb, Sr and Ba) allowed for the determination of the relative ionization efficiency of each metal relative to black carbon (RIEmeas). The
observed RIEmeas/RIEtheory values were larger than unity for Na, Rb, Ca, Sr and Ba due to thermal surface ionization (TSI) on the surface of the laser-heated RB particles. Values closer to unity were obtained for the transition metals Zn, Cu, V and Cr. Mn, Fe, and Ni presented the lowest RIEmeas/RIEtheory ratios and highest deviation from unity. The latter discrepancy is unexplained; however it may be related to problems with our calibration method and/or the formation of metal complexes that were not successfully quantified. The response of the metals to the laser power was investigated and the results indicated that a minimum pump laser current of 0.6 A was needed in order to vaporize the metals and the refractory black carbon (rBC). Isotopic patterns of metals were resolved from high-resolution mass spectra, and the mass-weighted size distributions for each individual metal ion were obtained using the high-resolution particle time-of-flight (HR-PTToF) method. The RIEmeas values obtained in this study were applied to the data of emission measurements in a heavy-fuel-oil-fired heating station. Emission measurements revealed a large number of trace metals, including evidence for metal oxides and metallic salts, such as vanadium sulfate, calcium sulfate, iron sulfate and barium sulfate, which were identified in the SP-AMS high-resolution mass spectra. SP-AMS measurements of Ba, Fe, and V agreed with ICP-MS analyzed filter samples within a factor of 2 when emitted rBC mass loadings were elevated.
Modelling the contribution of biogenic volatile organic compounds to new particle formation in the Jülich plant atmosphere chamber

We used the Aerosol Dynamics gas- and particle-phase chemistry model for laboratory CHAMber studies (ADCHAM) to simulate the contribution of BVOC plant emissions to the observed new particle formation during photooxidation experiments performed in the Jülich Plant-Atmosphere Chamber and to evaluate how well smog chamber experiments can mimic the atmospheric conditions during new particle formation events. ADCHAM couples the detailed gas-phase chemistry from Master Chemical Mechanism with a novel aerosol dynamics and particle phase chemistry module. Our model simulations reveal that the observed particle growth may have either been controlled by the formation rate of semi- and low-volatility organic compounds in the gas phase or by acid catalysed heterogeneous reactions between semi-volatility organic compounds in the particle surface layer (e.g. peroxyhemiacetal dimer formation). The contribution of extremely low-volatility organic gas-phase compounds to the particle formation and growth was suppressed because of their rapid and irreversible wall losses, which decreased their contribution to the nano-CN formation and growth compared to the atmospheric situation. The best agreement between the modelled and measured total particle number concentration (R^2 > 0.95) was achieved if the nano-CN was formed by kinetic nucleation involving both sulphuric acid and organic compounds formed from OH oxidation of BVOCs.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Urban circular bioeconomy (UrCirBio), University of Helsinki, Lund Univ, Lund University, Division of Nuclear Physics, Institute for Energy- and Climate Research (IEK-8), Forschungszentrum Jülich (FZJ), Institute of Biogeosciences (IBG-2)
Number of pages: 22
Pages: 10777-10798
Publication date: 28 Sep 2015
Peer-reviewed: Yes

Publication information
Journal: Atmospheric Chemistry and Physics
Volume: 15
Issue number: 18
ISSN (Print): 1680-7316
Ratings:
Scopus rating (2016): CiteScore 5.72 SJR 3.264 SNIP 1.756
Scopus rating (2015): SJR 3.308 SNIP 1.531 CiteScore 5.19
Scopus rating (2014): SJR 3.482 SNIP 1.698 CiteScore 5.17
Model studies of volatile diesel exhaust particle formation: Are organic vapours involved in nucleation and growth?

A high concentration of volatile nucleation mode particles (NUP) formed in the atmosphere when the exhaust cools and dilutes has hazardous health effects and it impairs the visibility in urban areas. Nucleation mechanisms in diesel exhaust are only poorly understood. We performed model studies using two sectional aerosol dynamics process models AEROFOR and MAFOR on the formation of particles in the exhaust of a diesel engine, equipped with an oxidative after-treatment system and running with low fuel sulfur content (FSC) fuel, under laboratory sampling conditions where the dilution system mimics real-world conditions. Different nucleation mechanisms were tested. Based on the measured gaseous sulfuric acid (GSA) and non-volatile core and soot particle number concentrations of the raw exhaust, the model simulations showed that the best agreement between model predictions and measurements in terms of particle number size distribution was obtained by barrier-free heteromolecular homogeneous nucleation between the GSA and a semi-volatile organic vapour combined with the homogeneous nucleation of GSA alone. Major growth of the particles was predicted to occur due to the similar organic vapour at concentrations of (1-2) &times; 10^{12} \text{cm}^{-3}. The pre-existing core and soot mode concentrations had an opposite trend on the NUP formation, and the maximum NUP formation was predicted if a diesel particle filter (DPF) was used. On the other hand, the model predicted that the NUP formation ceased if the GSA concentration in the raw exhaust was less than 10^{10} \text{cm}^{-3}, which was the case when biofuel was used.

General information

State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Research area: Aerosol Physics, Urban circular bioeconomy (UrCirBio), Metropolia University of Applied Sciences, Helsinki University, Norwegian Institute for Air Research, Max-Planck-Institut für Kernphysik, Deutsches Zentrum für Luft and Raumfahrt (DLR)
Authors: Pirjola, L., Karl, M., Rönkkö, T., Arnold, F.
Number of pages: 18
Pages: 10435-10452
Publication date: 23 Sep 2015
Peer-reviewed: Yes

Publication information
Journal: Atmospheric Chemistry and Physics
Volume: 15
Issue number: 18
ISSN (Print): 1680-7316
Ratings:
Scopus rating (2016): CiteScore 5.72 SJR 3.264 SNIP 1.756
Scopus rating (2015): SJR 3.308 SNIP 1.531 CiteScore 5.19
Scopus rating (2014): SJR 3.482 SNIP 1.698 CiteScore 5.17
Scopus rating (2013): SJR 3.784 SNIP 1.854 CiteScore 5.34
Modelling new particle formation and growth using combined power law and log-normal distribution model

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics
Authors: Olin, M., Dal Maso, M.
Publication date: 8 Sep 2015

Host publication information
Title of host publication: EAC 2015, European Aerosol Conference
Place of publication: Milan, Italy
Publisher: Italian Aerosol Society
ASJC Scopus subject areas: Pollution
Links: http://www.eac2015.it/ (Conference website)
Research output: Professional › Conference contribution

Exhaust Particles and NOx Emission Factors of a Modern Heavy Duty Truck equipped with the SCR in Real-world Driving Conditions

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Authors: Saari, S., Karjalainen, P., Pirjola, L., Ntziachristos, L., Keskinen, J., Rönkkö, T.
Publication date: Sep 2015

Host publication information
Title of host publication: EAC 2015, European Aerosol Conference, 6-11 September, 2015, Milan, Italy
Bibliographical note
ISBN kysytty, HO.
Ei ole, HO.
Research output: Professional › Conference contribution
Studies of Physical Phase State of Aerosol Nanoparticles

Aerosol particles produced in the atmosphere have major effects on the life on Earth: cloud formation starts on seed particles, often formed by photochemical oxidation of biogenic volatile organic compounds; visibility, corrosion, and health problems are caused by anthropogenic hydrocarbon and sulfur emission processed into particles by the atmosphere and the sun.

Naturally occurring secondary organic aerosol (SOA) particles can produce up to a half of the non-refractory mass of aerosol particles of less than micrometer in size. This makes SOA a large contributing factor to the climate system of the Earth. The actual effect that these particles have is, however, not well known, compared to the other effects affecting the climate. The research effort to increase the understanding and reduce the uncertainties around the climate effects of SOA encompasses an interdisciplinary research community.

The recent advance made by the observation of a solid phase of SOA by Virtanen et al. (2010) was the starting point for this thesis. The solid phase of SOA particles means that a long-held assumption of a partition equilibrium between the condensed phase and the gas phase of the semivolatile species may be wrong and produce too low a timescale for the particle chemical reaction rates and uptake coefficients.

This work consists of new developments in the instrumentation of particle properties as well as new observations of laboratory-generated secondary organic aerosol. The method development has two branches, one concentrates on finding more information from the measurement signal of an electrical low pressure impactor (ELPI) used in a somewhat unconventional way, whereas the other consists of a new detection method for particle bounce and response to different humidity and phase hysteresis induced by a carefully controlled humidity history.

The methods and observations made during this work are by no means the final word on the subject, but they are being used and further developed by the scientific community. Study of the particle phase and bounce as well as SOA mechanical properties and kinetics is well underway, and its results will be used to further refine the understanding of both aerosol fundamentals as well as the climate system.
Portable emission measurement system (PEMS) for tailpipe and exhaust plume aerosols

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: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Publication date: 15 Jun 2015

Host publication information
Title of host publication: Aerosol Technology 2015
Article number: O086
Keywords: vehicle emissions, emission measurement

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

Diffusion charger based monitoring of urban aerosols

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: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Publication date: 12 Mar 2015

Host publication information
Title of host publication: REPORT SERIES IN AEROSOL SCIENCE : Proceedings of the NOSA-FAAR Symposium 2015
Modelling particle distribution using combined power-law and log-normal distribution model

General information
State: Published
Ministry of Education publication type: A4 Article in a conference publication
Organisations: Research area: Aerosol Physics, Department of Physics
Authors: Olin, M. P., Dal Maso, M. I.
Publication date: 12 Mar 2015

Host publication information
Title of host publication: Proceedings of the NOSA-FAAR Symposium 2015
Place of publication: Kuopio, Finland
Publisher: Aerosolitutkimusseura r.y., Finnish Association for Aerosol Research c/o University of Helsinki, Department of Physics
ISBN (Electronic): 978-952-75091-17-3
ASJC Scopus subject areas: Pollution
Links:
http://www.atm.helsinki.fi/FAAR/reportseries/rs-165.pdf

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

Concentration and composition gradients of exhaust and non-exhaust particles near a major road

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics
Publication date: 2015

Host publication information
Title of host publication: EAC 2015, European Aerosol Conference, 6-11 September, 2015, Milan, Italy

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

Detection of the relativistic electrons at atmosphere

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Sodankylä Geophysical Observatory FIN-99600 Sodankylä Finland
Authors: Gholizadehalkhoran, H., Turunen, E.
Publication date: 2015

Host publication information
Title of host publication: FINCOSPAR 2015
Diesel engine exhaust particle measurements using a particle size magnifier (PSM)

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics, Research group: The Instrumentation, Emissions, and Atmospheric Aerosols Group
Authors: Kuuluvainen, H., Karjalainen, P., Saukko, E., Nousiainen, P., Karhu, T., Pirjola, L., Keskinen, J., Rönkkö, T.
Publication date: 2015

Host publication information
Title of host publication: EAC 2015, European Aerosol Conference, 6-11 September, 2015, Milan, Italy

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

Fluorescence-based Real-Time Characterization of Bioaerosols

General information
State: Published
Ministry of Education publication type: G5 Doctoral dissertation (article)
Organisations: Department of Physics, Research area: Aerosol Physics
Authors: Saari, S.
Number of pages: 53
Publication date: 2015

Publication information
Place of publication: Tampere
Publisher: Tampere University of Technology
Original language: English

Publication series
Name: Tampere University of Technology. Publication
Publisher: Tampere University of Technology
Volume: 1294
ISSN (Print): 1459-2045

Bibliographical note
Awarding institution: Tampere University of Technology
Research output: Collection of articles › Doctoral Thesis

Gas and particle composition and properties of photochemically aged ship plumes using chemical ionization and aerosol mass spectrometry

General information
State: Published
Ministry of Education publication type: D3 Professional conference proceedings
Organisations: Department of Physics, Research area: Aerosol Physics
Authors: Psichoudaki, M., Faxon, C., Kuuluvainen, H., Thomson, E. S., Eriksson, A., Mallqvist, J., Pettersson, J., Hallquist, Å., Kristensson, A., Hallquist, M.
Publication date: 2015

Host publication information
Title of host publication: EAC 2015, European Aerosol Conference, 6-11 September, 2015, Milan, Italy

Bibliographical note
Monitoring urban air quality with a diffusion charger based electrical particle sensor

Abstract Urban air contains considerable amounts of harmful gaseous substances and aerosol particles. In this study, a recently introduced diffusion charger based PPS-M particle sensor (Pegasor Oy, Tampere, Finland) was evaluated for outdoor air quality measurements in urban environment. The PPS-M particle sensor was used in two stationary air quality measurement stations, one located in the roadside environment and the other in residential area, and in a mobile laboratory. The sampling of urban aerosol to the PPS-M sensor was performed without any pre-conditioning of aerosol.

The sensor response to PM2.5 varied between the measurements, being between 7 and 30 fA/(µg/m³) depending on the aerosol source. The highest PM2.5 response was observed in the roadside study for exhaust particles while the lowest PM2.5 response was observed for large long range transported aerosol particles having relatively large mean particle size. The sensor signal was found to produce very linear response, with only minimal deviation, to the lung deposited particle surface area concentration (from 4.5 to 6 fA/(µm²/cm³)) and to the condensation sink of urban air particles (from 1.0 × 10⁴ to 1.2 × 10⁴ fA cm³). The sensor response to particle number concentration was defined to be 0.0044 fA/(1/cm³) in roadside environment. In this environment, the signal was found to correlate also with NO and NO₂ concentrations of roadside air due to the same origin of particulate and gaseous pollutants. Similar correlation between NOx and the PPS-M signal was not observed in residential area.

General information
State: Published
Ministry of Education publication type: A1 Journal article-refereed
Organisations: Department of Physics, Department of Signal Processing, Research area: Aerosol Physics, Urban circular bioeconomy (UrCirBio)
Publication date: 2015
Peer-reviewed: Yes
Early online date: 1 Jan 2014

Publication information
Journal: Urban Climate
Volume: 14
Issue number: 3
ISSN (Print): 2212-0955
Ratings:
Scopus rating (2016): SJR 1.09 SNIP 1.313 CiteScore 2.92
Scopus rating (2015): SJR 0.846 SNIP 1.043 CiteScore 2.23
Scopus rating (2014): SJR 0.494 SNIP 1.095 CiteScore 1.69
Scopus rating (2013): SJR 0.324 SNIP 0.341 CiteScore 1.36
Original language: English
Keywords: Particle sensor, Urban air quality, Traffic emissions, Instrument comparison
DOIs: 10.1016/j.uclim.2014.10.002

Bibliographical note
ORG=fys,0.5
ORG=sgn,0.5
Source: RIS
Source-ID: urn:C09F5E550C75A3945CB60BFFC830456C
Research output: Scientific - peer-review › Article

Seasonal and diurnal variations of fluorescent bioaerosol concentration and size distribution in the urban environment

A recently introduced fluorescence based real-time bioaerosol instrument, BioScout, and an ultraviolet aerodynamic particle sizer (UVAPS) were used to study fluorescent bioaerosol particles (FBAP) in the Helsinki metropolitan area, Finland, during winter and summer. Two FBAP modes at 0.5–1.5 µm (fine) and 1.5–5 µm (coarse) were detected during the summer, whereas the fine mode dominated in the winter. The concentration and proportion of the coarse FBAP was high in summer (0.028 #/cm³, 23%) and low in winter (0.010 #/cm³, 6%). Snow cover and low biological activity were assumed to be the main reasons for the low coarse FBAP concentration in the wintertime. Both the fine and the coarse FBAP fraction typically increased at nighttime during the summer. Correlations between the BioScout and the UVAPS were high with the coarse (R = 0.89) and fine (R = 0.92) FBAP. The BioScout showed 2.6 and 9.7 times higher detection efficiencies for the coarse and fine FBAP, respectively, compared to the UVAPS. A long-range transport episode of particles from Eastern Europe increased the fine FBAP concentration by over two orders of magnitude compared to the clean period in the winter, but these FBAP probably also included fluorescent non-biological particles.
Correlation analysis indicates that local combustion sources did not generate fluorescent non-biological particles that can disturb fine FBAP counting. The results provide information that can be used to estimate health risks and climatic relevance of bioaerosols in the urban environment.

The critical velocity of rebound determined for sub-micron silver particles.
A source-orientated approach for estimating daytime concentrations of biogenic volatile organic compounds in an upper layer of a boreal forest canopy

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