

## Description of 10 selected publications relevant to my Black Carbon/Soot research

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1. Zhang RY., Khalizov AF., **Pagels J.**, Zhang DD., Xue H., J. Chen and McMurry PH. (2008) Remarkable variability in morphology, hygroscopicity and optical properties of soot aerosols during internal mixing in the atmosphere. *Proceedings of the National Academy of Sciences of the United States of America*. 30: 10291-10296. Nbr. of Citations: 237  
[My most cited paper. Quantitative measurements of the mass uptake of secondary species onto soot particles during atmospheric processing were for the first time combined with dedicated measurements of climate relevant properties. The results indicated that both cloud formation abilities and the optical properties of soot changes dramatically upon atmospheric processing. A key to the study was a unique collaboration between atmospheric chemists and aerosol scientists. It remains one of the most highly cited papers on soot transformation.](#)
2. Bølling AK., **Pagels J.**, Yttri K-E., Barregard L., Sällsten G., Schwarze PE., Boman C. (2009) Health effects of residential wood smoke particles: the importance of combustion conditions and physicochemical particle characteristics. *Particle & Fibre Toxicology*, 6. Nbr. of Citations: 111.  
[A multi-disciplinary review paper, where the knowledge in the fields of toxicology, emission research and aerosol science was combined. In the paper I was responsible for formulating a conceptual model of the main particle types occurring in biomass combustion emissions. At the time the model was largely hypothetical. It has been highly influential in the area and has since been experimentally verified by our group and others.](#)
3. Eriksson, Axel; Nordin, Erik; Nyström, Robin; Pettersson, Esbjörn; Swietlicki, Erik; Bergvall, Christoffer; Westerholm, Roger; Boman, Christoffer; **Pagels, Joakim** (2014) Particulate PAH Emissions from Residential Biomass Combustion: Time-resolved Analysis with Aerosol Mass Spectrometry" *Env. Sci. & Techn* Accepted. May 2014. Nbr. of Citations: 3.  
[The paper shows that Polycyclic Aromatic Hydrocarbons \(a group of compounds that are keys in soot formation and are also carcinogenic\) are emitted in strong emission spikes under specific combustion conditions. The paper illustrates that time-resolved composition measurements with Aerosol Mass Spectrometry can be highly valuable to identify mechanisms for elevated emissions. The results indicate a need to update recommendations that are given to the public for clean burning of solid biofuels.](#)
4. Nordin E. Z., A. C. Eriksson, P. Roldin, P. T. Nilsson, J. E. Carlsson, M. K. Kajos, H. Hellén, C. Wittbom, J. Rissler, J. Löndahl, E. Swietlicki, B. Svenningsson, M. Bohgard, M. Kulmala, M. Hallquist and **Pagels JH.** (2013) Secondary organic aerosol formation from idling gasoline passenger vehicle emissions investigated in a smog chamber. *Atmos. Chem. Physics*, 13, 6101-6116, doi:10.5194/acp-13-6101-2013. Number of citations: 18  
[In this paper we showed that the secondary particle emissions formed in the atmosphere can be substantially higher than the normally measured primary emissions for commonly used gasoline vehicles. The results have recently been replicated by several other groups and together with on-going developments in emission reduction technologies it changes our view of the pollution levels from gasoline vs diesel fueled vehicles.](#)
5. Rissler J, Messing Maria, Malik Azhar, Nilsson Patrik, Nordin Erik, Bohgard Mats, Sanati Mehri and **Pagels, JH.** (2013) Effective densities of soot agglomerates from various sources using the aerosol particle mass analyzer. *Aerosol Science and Technology* 47: 792-805. DOI:10.1080/02786826.2013.791381. Number of citations: 11  
[In this paper we combined measurements of the particle mass and mobility diameter for soot from a number of sources. We found that by revising a recently developed theoretical model \(Kansas State University\) between length scales and the particle mass, This relationship could for all soot types be described by a single equation.](#)

6. **Pagels J.**, Khalizov A., McMurry PH. and Zhang RY. (2009) Processing of Soot by Controlled Sulphuric Acid and Water Condensation – Mass and Mobility Relationship. *Aerosol Science and Technology* 43: 608-620. Number of citations: 76  
In this paper we introduced a new technique to precisely measure the particle size resolved mass uptake of secondary species onto agglomerated soot particles. The method also gives insight into the effects of particle morphology on the transport properties. The paper was the first to separate the effects of mass uptake and restructuring on the particle morphology. It shows that the soot core collapses into a more compact shape upon condensation of components with moderate to high surface tensions. The technique is now routinely used in more than 20 laboratories in the world to investigate the effects of organic coatings on a number of particle properties.
7. Bladh H., J. Johnsson, J. Rissler, H. Abdulhamid, N.-E. Olofsson, M. Sanati, **J. Pagels** and P.-E. Bengtsson (2011) Influence of soot particle aggregation on time-resolved laser-induced incandescence signals. *Applied Physics B: Lasers and Optics* 104: 331-341. Number of citations: 11  
The first joint paper between the aerosol technology and the combustion physics groups in Lund. By combining state-of-the art methods from the two communities, we could improve the interpretation of the size measurement provided by the laser based in-situ LII technique.
8. Dutcher DD., **J. Pagels**, A. Bilka, L. Franklin, M. Stolzenburg, S. Thompson, J. Medrano, N. Brown, DS. Gross, DB Kittelson, PH. McMurry (2011) Emissions from soy biodiesel blends: A single particle perspective. *Atmospheric Environment* 45: 3406-3413. Number of citations: 8  
In this paper the different particle types emitted from a set of fuel mixtures ranging from pure biodiesel to pure fossil diesel were investigated in Dave Kittelsons laboratory at the University of Minnesota. The results show an increasing organic fraction for the biodiesel emissions compared to fossil diesel emissions. Prof. Kittelson has pioneered diesel emission research over the last 20 years.
9. Malik A., Abdulhamid H., **Pagels J.**, Rissler J., Lindskog M., Bjorklund R., Jozsa P., Visser J., Spetz A., and Sanati M. (2011) A Potential Soot Mass Determination Method from Resistivity Measurement of Thermophoretically Deposited Soot *Aerosol Science & Technology* 45: 284-294. Number of citations: 9  
The paper illustrates a novel concept to detect soot downstream diesel particulate filters in commercial vehicles onto a resistivity sensor, using thermophoresis, a common aerosol transport mechanism. The project was collaboration with Volvo Technology.
10. **Pagels J.**, Wierzbicka A., Nilsson E., Isaxon C., Dahl A., Gudmundsson A., Swietlicki E. and Bohgard M. (2009) Chemical composition and mass emissions factors of particle emissions from candles. *Journal of Aerosol Science* 40: 193-208. Number of citations: 50  
The paper illustrates that three vastly different particle types with different chemistry as well as particle size are emitted from indoor burning of candles. It illustrates that the highest fraction of particles by number are not soot containing as previously thought at the time, but rather consists of additives from the wick.