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Formation and properties of organic films on inorganic aerosol particles

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The interaction of the inorganic and the organic aerosol components with respect to hygroscopic behavior of atmospheric particles is still an open question. We set up a tandem system to study the formation and the behavior of organic coatings on inorganic particles. The particles are size selected by an Differential Mobility Analyzer and exposed to different organic vapor concentrations, which are controlled by the temperature of the corresponding organic liquid. The efficiency and the reproducibility of the coating process was monitored by measurement of the particle growth with a SMPS3071A/CPC3022A. Moreover, the chemical composition of the particles was determined by an Aerodyne Mass Spectrometer. The coating process proved to be reproducible to a high degree. Since electromobility was used for size selection, after neutralization the sample contained up to three particle sizes, which were resolved in the SMPS and the AMS measurements. The size measurement of the coated particles together with the measurement of the vacuum aerodynamic diameter (d*rho)) allowed for the determination of the density (changes) by the coating for particles of different sizes. These are in accordance with the organic mass fraction of the particles as expected in terms of condensation theory.

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