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Laboratory Measurements of spray generated mixed inorganic/organic Particles

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In recent years the organic aerosol component received increasing attention in laboratory studies due to the lack of understanding of the exact effects of an organic component on physical and chemical properties of aerosol particles. In this study we measured the chemical composition of particles generated from mixed solutions of Ammonium Sulphate and Dicarboxylic acids. The driving question was to investigate in how far the aerosol generated from a certain solution has exactly the same composition as the solution. An Aerodyne Aerosol Mass Spectrometer (AMS) was used to measure chemical composition as a function of particle size. The same approach was chosen for mixtures of ammonium sulphate and dicarboxylic acids with levoglucosan. The details of separating the different organic mass spectra will be discussed. It was found that the particles contained enhanced ammonium and sulphate concentration compared to the composition of the solution. The enhancement was generally dependant on the vapour pressure of the organic compound with higher vapour pressures leading to an increase in the loss of organics from the particles. Additionally the depletion in the organic compound was found to be size dependant with smaller particles generally exhibiting a larger loss of the organic compound. This is in accordance with expectations for evaporation processes. A similar effect was observed when levoglucosan was present as a non volatile aerosol component.