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Analysis of Organic Coated Soot Aerosol Using Aerosol Time-of-flight Mass Spectrometry

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Among the many particle types found in ambient air, some of the most difficult particles to distinguish between are those composed of elemental carbon (EC), organic carbon (OC), and mixtures of EC/OC. Ideally, one would like to be able to differentiate between EC and OC particle types emitted from different sources as well as possess the ability to determine the thickness of the organic coatings present. A laboratory experiment was carried out in which EC particles were coated with pure organic compounds, as well as complex organic mixtures. Monodisperse EC particle cores generated by spark discharge (PALAS) were coated with varying OC thicknesses and the shift in particle size was monitored using a tandem DMA arrangement. Chemical composition was monitored using aerosol time-of-flight mass spectrometry (ATOFMS). This presentation will detail the ability of ATOFMS to provide a quantitative measure of the amount of EC versus OC in ensembles of particles with similar composition.