Insoluble Residues from Isoprene-Derived Secondary Organic Aerosol Determined by Nanoparticle Tracking Analysis and Microspectroscopy Techniques

REBECCA PARHAM, Alison Fankhauser, Jia Shi, Madeline Cooke, Jin Yan, Cara Waters, Yao Xiao, Katherine Kolozsvari, N. Cazimir Armstrong, Zhenfa Zhang, Avram Gold, Jason Surratt, Andrew Ault, *University of Michigan*

Abstract Number: 631
Working Group: Instrumentation and Methods

Abstract
Atmospheric aerosols significantly offset positive radiative forcing due to their contributions as cloud condensation nuclei (CCN) and ice nucleating particles (INPs). The cloud-aerosol-precipitation interactions in the atmosphere are determined by physical and chemical properties of aerosol particles, which can undergo many cycles of droplet activation and subsequent drying before dry or wet deposition from the atmosphere. Secondary organic aerosol (SOA) is an abundant class of aerosol and has been previously shown to contribute to aerosol formed from cloud processing. Isoprene-derived secondary organic aerosol SOA (iSOA) is a particularly important class of aerosol involved in cloud processing. iSOA has both soluble and insoluble components, but there has been a measurement gap in characterizing the insoluble components, as most analyses have focused on soluble components. These measurements are needed as previous research has suggested that insoluble components could be important with respect to CCN and INP formation.

Herein, we analyze the insoluble components of SOA generated from the reactive uptake of IEPOX onto acidic seed particles (ammonium sulfate + sulfuric acid at different ratios for different pH conditions) in an atmospheric chamber. We characterize the size distributions and chemical composition, using NanoParticle Tracking Analysis (NTA), Raman microspectroscopy and atomic force microscopy infrared (AFM-IR) spectroscopy as a function of sulfate aerosol seed pH. These insights may help understand aerosol properties after cloud cycling in the atmosphere.