Seminar Series 2014 - 2015

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

Probing Aerosol Particle Mimics with Droplet Microfluidics

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Atmospheric aerosols are an important contributor to Earth's climate, and yet remain the largest source of uncertainty in modeling of future climate change. This uncertainty arises due to the intricate nature of aerosol particles — specifically how multiple phases within an aerosol particle interact with each other. Many factors play a role in determining a particle's internal structure, resulting in many possible particle configurations. For example, the aqueous and organic phases in a single aerosol particle may align in side-by-side nodule morphology, or the organic phase may form a film that completely surrounds the aqueous phase. In order to fully predict a particle's internal structure at a given temperature, relative humidity, and chemical composition, fundamental studies of interfaces observed in atmospheric aerosol particles are essential.

In this seminar, I will discuss our recent developments to harness droplet microfluidics to probe the fundamental properties of aerosol particle interfaces. By using this microscale platform, important rheological, thermodynamic, and kinetic properties of atmospheric aerosol mimics can be explored, yielding insight into multiphase aerosol particle dynamics. Specifically, I will highlight recent results from our lab in which we studied the time-dependent interfacial tension of a reacting methylglyoxal—aqueous ammonium sulfate mixture, its evolution with time, and the relevance of these results to the atmosphere.

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Wallberg Building, 200 College Street, Room 407

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