Seminar Series 2019 - 2020

Southern Ontario Centre for Atmospheric Aerosol Research

University of Toronto

Atmospheric Aerosol Analysis by Online Extractive Electrospray Ionization Mass Spectrometry

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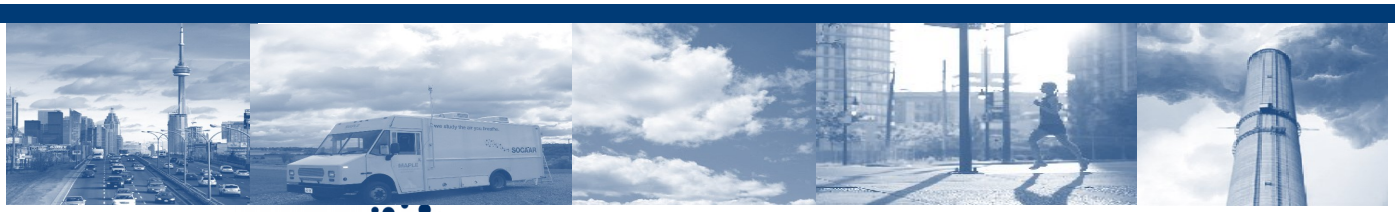
Mass spectrometry is a powerful tool for the analysis of aerosol composition. However, tradeoffs typically exist between the loss of chemical information due to thermal decomposition and/or ionization-induced fragmentation on the one hand, and lower time resolution and/or separated collection/analysis stages on the other. We address these issues through the development of an extractive electrospray ionization time-of-flight mass spectrometer (EESI-TOF), which provides online, highly time-resolved measurements of aerosol composition without significant decomposition or fragmentation. Further, the EESI-TOF provides a versatile sampling/ionization framework, as by simply changing the composition of the primary spray and mass spectrometer polarity, the instrument can be configured to optimize detection of different organic fractions or water-soluble metals, while the sampling inlet can be configured to allow separate detection of the gas and particle phase. Two applications of the EESI-TOF are presented. First, we demonstrate rapid intra-particle decomposition reactions in secondary organic aerosol generated from the dark ozonolysis of α-pinene, as well as further reaction on the exposure of the aerosol to visible light. Second, we explore the sources and processes governing SOA composition in complex urban environments.

Wednesday, December 4, 2019 3:00 - 4:00PM

Wallberg Building, 200 College Street, Room 215



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