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הפקולטה להנדסה כימית
ע"ש וולפסון
The Wolfson Department of Chemical Engineering

**Wolfson Department of Chemical Engineering Seminar**
**Lecture Hall 6, Wolfson Department of Chemical Engineering,**
**Wednesday November 6th, 2019 at 13:30**

# Atmospheric Dicarboxylic Acids: Characterization, Transformation, and Implications

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Atmospheric aerosols, also known as particulate matter (PM), are suspensions of fine solid or liquid particles in air. Beside the influence of energy balance of our earth by scattering and absorbing radiation, exposure to particulate matter has been associated with adverse health effects, e.g., increased mortality, decreased lung function, bronchitis incidents, and respiratory diseases. Major atmospheric aerosols comprise a combination of both inorganic, including water, sulfates, nitrates, ammonium, trace metals, and organic matter. Low molecular weight (LMW) dicarboxylic acids (DCAs) are important in atmospheric organic aerosols because they can be contributed by primary sources such as emissions of vehicles and biomass burning, as well as through atmospheric transformation of precursors (such as levoglucosan and longer-chain DCAs).

While their concentrations were reported in various field studies, only until recently, concentrations of DCAs were successfully differentiated from that of counter salt compounds (dicarboxylates) through our newly established method. In addition to describing the method, this presentation will also talk about photooxidation kinetics of individual $C_2$–$C_9$ DCAs and possible reaction mechanisms based on concentration profiles of identified intermediates to better understand the transformation of DCAs in atmospheric environment. Concentration profiles of the identified intermediates affirm two hypotheses: (1) longer DCAs can be the precursors of shorter DCAs, and (2) succinic acid can be oxidized to malonic acid with malic acid as an intermediate. In addition, the results indicate that ambient DCAs can also be precursors of substituted DCAs, and the spilt of center C-C bonding of parent DCAs, instead of sequential decarboxylation, appears to be a more dominant pathway contributing to smaller DCAs in the atmosphere. Finally, characterization of diurnal variations of PM2.5 acidity using an open thermodynamic system will be discussed in this talk.

Refreshments will be served at 13:15