CHE-0410045: Fundamental Studies of Nanoparticle Formation in Air Pollution: Soot nucleation and growth

Berk Oktem, Michael Tolocka, Murray Johnston, Chemistry, U. Delaware; Bin Zhao, Hai Wang, Aerospace and Mechanical Engineering, U. Southern California;

We have adapted a photoionization aerosol mass spectrometer (PIAMS) to follow the evolution of chemical composition of soot in flames. At lower heights above the burner surface (HAB), the soot chemical composition was found to be dominated by polycyclic aromatic hydrocarbons (PAH), confirming that during particle inception and initial growth the increase in particle mass results from an increase in the number of PAH of similar sizes in the particles. Somewhat unexpected, saturated and unsaturated aliphatic components in the soot increased substantially as the HAB increased, indicating that for the flame tested aliphatic compounds have a notable contribution to soot mass growth.