

# Fundamental Studies of Nanoparticle Formation in Air Pollution. CHE-0089136

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Water plays a key role in many particle formation processes. In our effort to understand nucleation of multicomponent, aqueous nanodroplets we have added a tunable diode laser absorption spectrometer (TDLAS) to our supersonic nozzle apparatus. We have followed the condensation of pure  $D_2O$  in the nozzle as a function of position using two absorption lines with different energy levels (top figure). Thus, we are able to make direct temperature measurements (lower figure) of the gas phase (gray circles:  $D_2O$  spectroscopy, triangles:  $CH_4$  spectroscopy). These results can be compared with the data derived from static pressure measurements. As illustrated in the figures, TDLAS measurements agree reasonably with the conventional results upstream of condensation and through the nucleation zone. Further downstream both TDLAS measurement sets both suggest that more material has condensed than expected!

Paolo Paci, Yury Zvinevich, Shinobu Tanimura, Barbara E. Wyslouzil, Mark Zahniser, Joanne Shorter, David Nelson, Barry McManus, *Spatially-resolved gas phase composition measurements in supersonic flows using tunable diode laser absorption spectroscopy*, J. Chem. Phys, 121, 9964-9970 (2004).

