



# PETER H. MCMURRY

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## CHEMICAL PROCESSES RESPONSIBLE FOR NUCLEATION AND GROWTH OF ATMOSPHERIC PARTICLES

It is now believed that nucleation contributes significantly to the global concentrations of condensation nuclei and cloud condensation nuclei. Because these particles likely affect the earth's radiation budget, it is important to account for them in climate models. This lecture summarizes our efforts aimed at understanding the birth of new atmospheric particles (i.e., nucleation) and their subsequent growth. This work has involved collaborations with colleagues at NCAR (James N. Smith, Fred Eisele, and Jun Zhao) and Augsburg College (David Hanson). Our efforts to understand nucleation have focused on measuring neutral molecular clusters and nanoparticles as they are born and grow. These measurements are being carried out with two new instruments: the Cluster CIMS (J. Zhao & F. Eisele), a mass spectrometer that measures the concentrations and composition of neutral clusters, and the DEG SMPS (Minnesota group), a new aerosol instrument that measures number distributions down to 1 nm. The TDCIMS (J. N. Smith), a mass spectrometer that can measure the composition of particles as small as 8 nm, has provided new information on species that contribute to the high observed growth rates. The Amp-MS (D. Hanson) is a new mass spectrometer that measures the gas phase concentrations of amines at pptv levels. Our work provides evidence that amines greatly enhance both nucleation and growth rates.

### Biographical Sketch

Peter H. McMurry is the Kenneth T. Whitby Professor of Mechanical Engineering at the University of Minnesota, where he has been since completing his Ph.D. at Caltech in 1977. His research focuses on aerosol measurement and behavior with a primary focus on atmospheric aerosols. Particular interests include tandem *in situ* measurements of the physical and chemical properties of complex aerosol particles, and measurements of chemical and physical properties of particles in the nanometer size range aimed at understanding the nucleation and growth of particles in the atmosphere. His group has developed aerodynamic lenses, ultrafine condensation particle counters, and tandem techniques that include the TDMA (DMA-DMA), DMA-APM, DMA-MALS (multiangle light scattering), etc. He received the Fuchs Memorial Award in 2006 and a Guggenheim fellowship in 2007.

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