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Gas-Phase Mixing of Organic Aerosol Systems

N. M. Donahue, E. S. Robinson, and E. M. Trump

Carnegie Mellon University, Center for Atmospheric Particle Studies, Chemistry, Chemical Engineering, and Engineering and Public Policy, Pittsburgh, United States (nmd@andrew.cmu.edu, +1-(0)412-2687139)

Models of organic-aerosol behavior rely on uncertain mixing thermodynamics. It is common to assume that the thousands of compounds comprising typical ambient organic-aerosol particles form a single amorphous solution, or at most separate into two well-mixed phases. Part of these models is often a substantial semi-volatile component, and exchange of vapors among particles is thought to be the principal mechanism through which the aerosol system comes to equilibrium. Here we present direct observations of aerosol mixing for relatively simple test systems using the single-particle capabilities of a high-resolution aerosol mass spectrometer equipped with optical light scattering for particle detection. We can indeed observe mixing (and non-mixing) consistent with expected behavior, for both simple (2-component) and more complex (single precursor SOA) systems.