Spectro-microscopy of Ambient Aerosol Particles: Observational Constraints on Mixing State Parameterization

RACHEL E. O'BRIEN[1,2]*, BINGBING WANG[3],
ALEXANDER LASKIN[3], MATTHEW WEST[4],
NICOLE RIEMER[5], MARY K. GILLES[2]
AND RYAN C. MOFFET[1]

[1]Department of Chemistry, University of the Pacific, Stockton, CA 95211, USA
(*correspondence: resellon@lbl.gov)
[2]Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA
[3]William R. Wiley Environmental and Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA 99352, USA
[4]Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA
[4]Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA

Individual aerosol particles are often mixtures of several different components such as inorganic salts, soot or elemental carbon, and organic molecules. The amounts of the different components in each particle and the particle morphologies will impact the CCN activity and the radiative properties of the aerosol population. A recent parameterization of the mixing state provides a clear transition between ambient measurements of aerosol components and particle mixing states used in climate models. Single particle spectro-microscopy techniques including scanning transmission x-ray microscopy/near-edge x-ray absorption fine structure spectroscopy (STXM/NEXAFS) and computer controlled scanning electron microscopy/energy dispersive x-ray spectroscopy (CCSEM/EDX) have been used to measure the composition of aerosol particles from the CARES campaign. Here we present results from the application of the per particle composition to a parameterization of the mixing state and provide constraints on the mixing state of ambient aerosol particles.