Chemical Composition and Morphological Characteristics of Ambient and Laboratory Generated Soot Particles

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The mixing of strongly absorbing soot particles with other organic and inorganic species can potentially have large effects on their optical and hygroscopic properties. To quantify these effects, a better understanding of soot particles should be gained by field and laboratory studies focused on studying the source and processing characteristics of soot. We present the chemical composition and morphology obtained from samples taken during the field based carbonaceous aerosols and radiative effects study (CARES) and the laboratory based soot aerosol aging study (SAAS). Soot particles were analyzed using scanning electron microscopy coupled with energy dispersive X-ray spectroscopy (SEM/EDX) and scanning transmission X-ray microscopy coupled with near edge X-ray absorption fine structure spectroscopy (STXM/NEXAFS). Results from CARES suggest that there is little morphological change in the soot inclusions between the urban and rural site. However, the degree of coating between the CARES urban and rural sites was significantly different. Initial results from the application of these spectromicroscopic measurements to the aerosols collected during SAAS will be presented.