Single Particle Organic Functional Groups on NCAR C130 and SIMAT Flux Tower during MILAGRO

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The organic fraction of ambient aerosol can account for 30-90% of the particle mass and yet the relevant properties of the organic fraction are not well characterized. Mass spectrometry techniques are often employed to measure bulk and single-particle chemical properties of ambient aerosols. Additional parameters regarding particle shape and heterogeneity are necessary for a complete understanding of how these particles affect the way they acquire or lose mass to the gas phase or interact with solar radiation. Scanning Transmission X-Ray Microscopy (STXM) is suitable for concurrent analysis of morphology and chemical composition, as particles can be studied under atmospheric pressure and the soft X-ray beams generated by a synchrotron radiation source can distinguish organic functional groups absorbing at different bonding energies of carbon-containing molecules. This work summarizes particles collected on two MILAGRO platforms, the NCAR C130 and the SIMAT Flux Tower. Many of the particles can be categorized according to four characteristic organic spectra. For comparison, we present analysis from particles collected at the SIMAT site in Mexico City and include comparisons with particles collected from ACE-ASIA, IMPEX, AND DYCOMS II.