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Morphology and composition of individual tannic and shikimic acid particles studied at oxidizing environmental conditions

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Organic particles have a central role in environmental processes due to their chemical and physical properties. Chemical and optical characteristics of particles can be altered by water absorption, oxidation and photochemical processes. In this study, changes in chemical composition and morphology of submicron tannic and shikimic acid particles were measured by utilizing scanning transmission X-ray Microscopy and Near edge X-ray absorption fine structure methods. Tannic acid, as an organic molecule present in nature, was chosen as a proxy of complex material present in the environment, whereas shikimic acid is a constituent of biomass burning aerosols [1]. An environmental micro reactor was facilitated in order to study the effect of ozone and humidity on tannic acid [2,3]. Changes at the oxygen edge were used to track uptake of water to the particles as a function of humidity. Changes in the shikimic acid particles were monitored in situ at the carbon edge by tracking the double bond peak at 284.4 eV during exposure to ozone.

1 P.M. Medeiros et al. Environ. Sci. Technol. 42 (2008)

2 T. Huthwelker et al. Rev. Sci. Instrum. 81 (2010)

3 V. Zelenay et al. J. Aerosol Sci. 42 (2011)

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