9th Annual Ambient Pressure X-ray Photoelectron Spectroscopy Workhop



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O K-edge NEXAFS in presence of high water vapor pressures

Content

Near-edge X-ray absorption fine structure (NEXAFS) spectroscopy is widely used to investigate the hydrogenbonding environment in aqueous solutions, ice, and adsorbed water (Nilsson et al. 2010, Starr et al. 2013, Björneholm et al. 2016). When Auger-Meitner electrons are detected, the method becomes inherently surfacesensitive because of the limited escape depth of electrons (Ammann et al. 2018).

In such X-ray absorption experiments, gas-phase water is inevitably present and impacts the acquired spectra in two ways Bluhm (2010). (1) Absorption along the X-ray path downstream of the sample reduces the X-ray flux reaching the condensed phase and (2) Spectra originating from gas-phase water in front of the analyzer cone contribute to the recorded spectra. Here, we show and discuss a procedure to disentangle the gas-phase and condensed-phase contribution in the spectra and to account for the presence of gas-phase water in I0 measurements in detail.

M. Ammann et al., X-Ray Excited Electron Spectroscopy to Study Gas–Liquid Interfaces of Atmospheric Relevance, in Physical Chemistry of Gas-Liquid Interfaces, Elsevier. p. 135-166 (2018).

O. Björneholm et al., Chem. Rev., 116, 7698-7726 (2016).

H. Bluhm, Journal of Electron Spectroscopy and Related Phenomena, 177, 71-84 (2010).

A. Nilsson et al., Journal of Electron Spectroscopy and Related Phenomena, 177, 99-129 (2010).

D. E. Starr et al., Chem. Soc. Rev., 42, 5833-5857 (2013).

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