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Environmental Science at ISS/SLS: Endstation Development and Characteristics

Content

The ISS beamline at SLS/PSI offers Near Ambient Pressure X-ray Excited Photoelectron Spectroscopy for environmental and for catalytic research (Orlando et al. 2016). Here, we present recent additions to the endstation and characterization of the beamline to support studies with relevance to atmospheric chemistry.

Cold parts of Earth's and other planets' atmospheres are regions of vivid chemistry (Bartels-Rausch et al. 2012). To mimic conditions in X-ray excited photoelectron spectroscopy experiments, water vapor partial pressure typical varies between 0.1 mbar and a few mbar, temperatures between room temperature and -50℃, and trace gases with relevance to atmospheric chemistry with partial pressures between 1E-9 mbar to 1E-3 mbar, order of magnitude lower than that of water (Bluhm 2010, Bartels-Rausch et al. 2014, Ammann et al. 2018). To optimize the ISS endstation further, we present

- A new cryo-sample holder with improved localized cooling and better temperature control.
- An updated dosing system that allows to dose even sticky trace gases at low partial pressure and in presence of water vapor.
- A new quadrupole mass spectrometer to detect trace gases at low, environmentally relevant partial pressure
- A characterization of ISS second order light and its impact on I0 measurements for NEXAFS studies at ISS
- Shifting the endstations position to tune the sensitivity to gas-phase species relative to condensed phase species during photoemission experiments.

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).

T. Bartels-Rausch et al., Rev. Mod. Phys., 84, 885-944 (2012).

T. Bartels-Rausch et al., Atmos. Chem. Phys., 14, 1587-1633 (2014).

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

F. Orlando et al., Top. Catal., 59, 591-604 (2016).

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