TRANSIENT LABORATORY NEXAFS SPECTROSCOPY ON SOLID AND LIQUID SAMPLES

RICHARD GNEWKOW, *SyncLab, Helmholtz-Zentrum Berlin für Material und Energie, Berlin, Germany*; ADRIAN JONAS, MARC DUMMIN, DANIEL GRÖTZSCH, SILVANA SCHÖNFELDER, *Institut für Optik und Atomare Physik, Technische Universität Berlin, Berlin, Germany*; HOLGER STIEL, *Department B2, Max-Born-Institute, Berlin, Germany*; BIRGIT KANNGIESSER, *Institut für Optik und Atomare Physik, Technische Universität Berlin, Berlin, Germany*; IOANNA MANTOUVALOU, *SyncLab, Helmholtz-Zentrum Berlin für Material und Energie, Berlin, Germany*.

Molecular systems can be used for a wide range of applications but for a complete description knowledge about their transient electronic properties is often required. Optical-pump soft X-ray-probe NEXAFS spectroscopy is an ideal technique to investigate these systems due to its elemental and orbital selectivity which allows probing the time evolution of the electronic structure. Our laboratory transient NEXAFS spectrometer [a] is based on a laser-produced plasma source covering an energy range between 200 – 1500 eV with an energy resolving power of $\geq$1000 and 500 ps time resolution. Due to the high efficiency of the setup, the investigation of absorption changes as small as 10^{-4} is possible [b]. These parameters allow obtaining high-quality time-resolved NEXAFS spectra formerly only attainable at synchrotron radiation sources.

Static and transient NEXAFS measurements in transmission of solid samples and measurements in the liquid phase with a flatjet system at the Carbon and Nitrogen K-edge as well as 3d metal L-edges will be presented. Possible synergies of these laboratory-based measurements in combination with synchrotron instrumentation will be discussed.

[a] A. Jonas et al., Opt. Express 27, 2019, 36524-36537
[b] A. Jonas et at., Anal. Chem. 92, 2020, 15611-15615