

Photon-in/photon-out spectroscopy in materials science

Tuesday, 13 September 2022 09:45 (35 minutes)

Instruments for photon-in/photon-out spectroscopy have become available on many X-ray absorption spectroscopy beamlines at synchrotron radiation sources. This makes the technique visible and accessible to many researchers in the materials science community. In particular, in situ and operando studies in catalysis and research related to energy storage greatly benefit from the larger information content when X-ray emission spectroscopy (XES) is added to X-ray absorption spectroscopy. Beamline ID26 at the ESRF features XES instruments for the hard and tender X-ray range. Their design maximizes detection efficiency for low analyte concentrations and time-resolved studies. In situ cells for tender X-rays must be inserted into the vacuum of the spectrometer chamber and windows have to be adapted to the short penetration depth of the tender X-rays. I will present the tender X-ray spectrometer and some examples for the application of photon-in/photon-out spectroscopy in materials science. I will furthermore discuss a new protocol for time-resolved and imaging studies using X-ray emission spectroscopy.

[1] J. Synchrotron Rad. (2021) 28 362 - 371

[2] J. Synchrotron Rad. (2020) 27 813 - 826

[3] Inorg. Chem. (2022) 61 869 -881

[4] Nanoscale, 2020 12 16270 - 16284

[5] Inorg. Chem. (2020) 59 12518 - 12535

Primary author: GLATZEL, Pieter (ESRF)

Presenter: GLATZEL, Pieter (ESRF)

Session Classification: Session 2 : Catalysis & Porous materials I