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## Development of photon-in/photon-out spectroscopy at PETRA III and applications to studies in catalysis

*Monday, 17 September 2018 15:00 (15 minutes)*

X-ray absorption spectroscopy (XAS) is nowadays a very established tool to investigate and understand chemical reactions on an atomic level. However, it suffers from particular limitations that hinder for example the identification of metal-reactant interactions in catalytic transformations or the detailed investigation of electronic structures. Nevertheless, hard X-rays are highly advantageous, as they tolerate nearly every experimental environment, as often found in operando studies. Therefore, the development of more sensitive methods, able to resolve the frontier orbital structure of catalysts and with the ability to distinguish coordinating light atoms that are neighbours in the periodic table, are highly needed. High energy resolution fluorescence detected XAS (HERFD-XAS), valence-to-core (VtC) and core-to-core (CtC) X-ray emission spectroscopy (XES) offer the opportunity to reach these aims.

In this talk, the presentation of spectrometer types that are funded by the BMBF and implemented at beamline P64 at PETRA III is connected to important results from the field of sustainable chemistry to demonstrate the high potential of such techniques for future applications of socio-economic relevance.

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