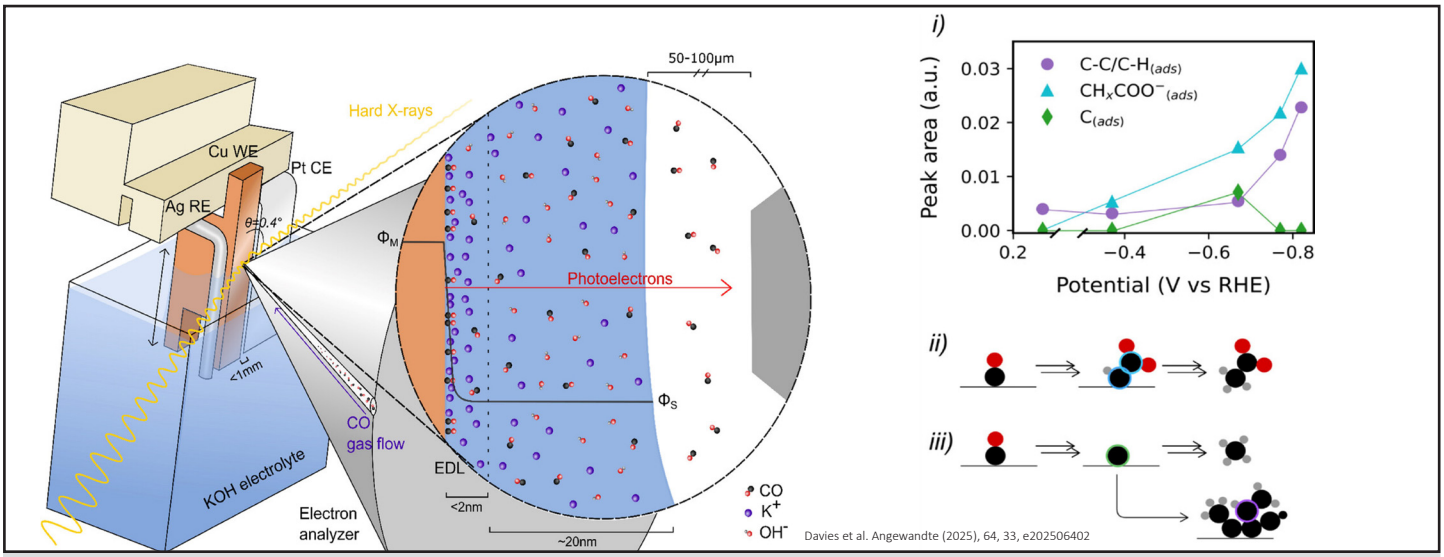
BAR XPS

For studies of industrially relevant catalytic reactions



Left: Schematic of the dip-and-pull set-up commissioned within the POLARIS instrument at beamline P22/Petra III, DESY. The three electrodes are held in-line on the sample holder with a <1 mm gap between to minimize the Ohmic drop. The hard X-rays are guided into the meniscus area and a balance between water thickness and conductivity is found.

Right: Potential dependence of carbon species detected under the reaction and depiction of the possible reaction pathways congruent with the available surface species.

It is estimated that up to 90 % of chemical products are produced via catalysis. Many heterogeneous catalytic reactions occur at high pressures and temperatures. To study these types of catalytic reactions, researchers at Stockholm University have constructed an instrument capable of measuring XPS under conditions of > 1 bar of pressure in the vicinity of the catalytically reactive surface.

Peter Amann and Anders Nilsson, et. al. present the instrument, which consists of a HiPP analyser, in the Review of Scientific instruments article “A high-pressure X-ray photoelectron spectroscopy instrument for studies of industrially relevant catalytic reactions at pressures of several bar”.

The performance of the instrument is demonstrated by measuring bulk 2p spectra from a copper single crystal at He pressures of up to 2.5 bar and C 1s spectra in gas mixtures of CO + H_2 at pressures up to 790 mbar. The capability of the instrument opens up the possibility of operando studies of heterogeneous catalytic reactions under industrial manufacturing conditions.

This 1 Bar XPS system solution is now available from Scienta Omicron.

BAR XPS advantages

- Study of catalytic reactions
- Measuring XPS under conditions of > 1 bar of pressure
- Open up the possibility of operando studies of heterogeneous catalytic reactions under industrial manufacturing conditions

Figure 1: The Scienta Omicron Bar XPS design was developed by Anders Nilsson and Peter Amann at Stockholm University. Bar XPS uses the virtual gas cell design, which creates a high local pressure area around the sample of > 1 bar.

Learn more at **www.scientaomicron.com/BAR-XPS**