ABSTRACT

In September 2018, a new X-ray undulator beamline (P22), fully dedicated to hard X-ray photoelectron spectroscopy (HAXPES) techniques, opened to users. This beamline has been designed to the specific needs of the HAXPES user community [1,2]. Adaptive beam focusing is realized by Be compound refractive lenses and/or horizontally deflecting mirrors down to a spot size of \( \sim 15 \times 17 \, \mu \text{m}^2 \) with a flux of up to \( 1.1 \times 10^{13} \, \text{ph/s} \) (for Si(111) at 6 keV).

P22 hosts four specialised experimental end stations for high-resolution studies of the electronic and chemical structure of complex materials, realistic device-like structures and catalytic interfaces. The main instrument for conventional HAXPES techniques offers sample cooling and in-situ electrical characterisation for \emph{operando} studies. A separate instrument provides full-field, sub-\( \mu \text{m} \) electron spectro-microscopy (HAXPEEM). Additionally, a specialized setup for high-pressure HAXPES applications (POLARIS) recently demonstrated its capabilities at pressures \( \sim 2.0 \) bar. Finally, a full-field \( k \)-microscope with time-of-flight energy discrimination delivered first fully \( k \)-resolved valence band structures in the HAXPES energy range (up to 7 keV). All instruments are implemented and operated in close collaboration with external user groups and as such reflect the wide range of scientific fields currently covered by our community.

Following a short presentation of the beamline capabilities I will highlight recent results from the instruments operated at P22.

REFERENCES