The SPEM@MAX-lab: Microspectroscopy results on layered materials

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Since the first photoelectron spectroscopy experiments by Siegbahn [1] and Turner [2] the method has passed through an outstanding symbiotic process of technical improvements and new experimental possibilities and approaches. In recent years a lot of work focussed on pushing the method to its very limits. Beside the refinement of energy resolution, the invention of parallel angle detection, the achievement of temperatures below 1 K and the filming of photoelectrons with time resolutions in the range of a few femtoseconds in particular spatial information about photoelectrons is getting more and more in the focus of developments.
The SPEM at MAX-lab, designed in the late 1990's by Johannson [3] at the undulator Beamline BL 31, provides unique focussing properties. After passing through two prefocussing mirrors in the well known Kirkpatrick-Baez configuration and through an ellipsoidal mirror the synchrotron light is focussed to a spot size of 1.5 μm for an available photon energy range of 15 eV to 170 eV. A VG CLAM 2 analysator at a fixed angle of 47.5° enables the detection of photoelectrons with an overall energy resolution below ΔE = 100 meV which makes this experiment a powerful tool to study the chemical composition of micro-structured materials.
To demonstrate the performance of this old, but for chemical contrast imaging still well-suited machine, we present data on different micro-structured layered materials [4] and compare the results to measurements obtained at recently new developed SPEM instruments at the ALS and Elettra.

References

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