

The SPELEEM at ELETTRA: A new instrument for spectromicroscopy

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Abstract

With the advent of third generation light sources, spectromicroscopy became a feasible technique, combining the advantages of microscopy and spectroscopy in one instrument. The SPELEEM (**S**pectroscopic **P**hoto **E**mission and **L**ow **E**nergy **E**lectron **M**icroscope) is such an instrument. It combines a low energy electron microscope (LEEM) with an imaging band pass filter, and is operating successfully since the end of 1996 at the undulator beamline 6.2 at the Sincrotrone ELETTRA, Trieste.

Combining various methods (e.g.: LEEM, LEED: low energy electron diffraction, MEM: mirror electron microscopy, VPEEM: valence band photoemission electron microscopy, AEEM: Auger emission electron microscopy, XPEEM: X-ray photo emission electron microscopy) in one instrument enables the user to obtain different kinds of information, like chemical properties and surface morphology, of the same small sample area.

The high brightness of the ELETTRA light source together with an optimized instrument setting result in a spatial resolution of 22 nm and an energy resolution better than 0.5 eV in XPEEM mode, which is to our knowledge the highest lateral resolution ever reported for a spectromicroscope [1].

The presentation will include recent results achieved with the instrument in the fields of surface science (interfactant-mediated growth of Pb on Si(111)), semiconductor technology (engineered Schottky-barriers), and mineralogy (oxidation of PbS).

[1] B. P. Tonner, *J. Electron Spectrosc. Relat. Phenom.* **75** (1995) 309.