Synchrotron radiation induced XPEEM spectromicroscopy for nanoscience and nanotechnology

Nick Barrett[1], Olivier Renault[2], Luiz Zagonel[1], Aude Bailly[2], Nick Brookes[3], Julio Cezar[3]

[1]DSM DRECAM SPCSI, CEA Saclay, 91191 Gif sur Yvette, France
[2]CEA-DRT/Léti SCPIO, 17 avenue des Martyrs, CEA Grenoble, France
[3]European Synchrotron Radiation Facility, BP 220, F-38043 Grenoble Cedex, France

Spectromicroscopy furnishes a unique tool for spatially and energy resolved electron spectroscopy on the sub 100 nm scale.

Full-field imaging spectromicroscopy at both high lateral (100 nm) and energy (100 meV) resolutions is becoming a reality thanks to novel instrument design combined with brilliant third generation synchrotron sources.[1]

The development of synchrotron radiation induced spectromicroscopy using the *NanoESCA* instrument, within the framework of the joint DSM-DRT nanocharacterization platform in the MINATEC© research pole in Grenoble, provides exciting openings for fundamental research in nanoscience.

The OMICRON *NanoESCA*[2] will allow performance of cutting edge research in nanoscience and nanotechnology. The main features of the instrument: aberration-corrected energy-filter (double hemispherical analyzer), complementary operating modes between synchrotron radiation XPEEM and laboratory XPEEM, as well as direct PEEM and micro-spectroscopy will be introduced.

The recent commissioning experiments using synchrotron radiation on the ID08 beamline of the ESRF will be presented. First results using a high intensity optimized Al K_α X-ray source and laboratory UV sources will also be shown, illustrating the dual synchrotron/laboratory operating modes.

Finally, we present several perspective research themes which will push the instrument to its ultimate energy and spatial resolution limits.

This research is supported by the French National Research Agency PNANO2005 XPEEM project.

[1] M. Escher *et al. J. Phys: Condens. Matter* **17** S1329 **(**2005)
[2] O. Renault *et al. Surf. Inter. Anal.* **38** 375 (2006)