



KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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Soft X-ray Spectromicroscopy

Soft X-ray spectromicroscopy is a synchrotron based technique for elemental identification, elemental specification, and spatial mapping of heterogeneous materials. When monochromatic X-ray beam is incident on a sample, it is absorbed and excites core electrons from a specific atom in a molecule to unoccupied molecular orbitals giving rise to near edge X-ray absorption spectra (XAS) around the elemental absorption edges. The XAS structures are closely related to chemical bonding and can be used to determine and quantify the presence of elements or compounds, similar to mid infrared (IR) spectroscopy.

To perform advanced soft X-ray spectromicroscopy measurements for materials science DEMETER beamline, has been constructed at SOLARIS synchrotron. The beamline is designed to achieve high energy resolution ($E/\Delta E = 3000 - 15000$) and high photon flux (10^{12} ph/s/0.01%bw) in the photon energy range 100-2000 eV with controllable polarization. The beamline is made up of two branches, each one having a microscope available: STXM (Scanning Transmission X-ray Microscopy) and X-PEEM (X-ray PhotoEmission Electron Microscopy) with an aim to reach spatial resolution below 20 nm and to fully exploit the local spectroscopic capabilities of the two microscopes. The availability of the two methods within the same beamline will enable the users to select the appropriate approach to study their specific case in terms of sample environment, spectroscopy methods, probing depth etc.

In this presentation, the characteristics and features of the beamline and its experimental stations will be discussed. Additionally, an overview of the microscopes operation modes will be briefly presented. Finally, possible research applications are demonstrated, based on results obtained so far.

Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

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