

First results from the X-ray photoelectron emission microscopy facility at the Canadian Light Source

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The X-ray photoemission electron microscope (X-PEEM) at the Canadian Light Source (CLS), Canada's new 3rd generation synchrotron, has begun user access and operation. The PEEM3 instrument from Elmitec GmbH was purchased in 2002 and operated at the Madison synchrotron until spring 2005, when it was moved to the CLS. It has been used on the spherical grating (SGM, 200-2000 eV) and plane grating (20 – 250 eV) beamlines at CLS. Ultimately it will be located on a specialized branch of the CLS spectromicroscopy beamline (Apple II EPU source, entrance slit-less PGM monochromator), providing x-ray illumination from 250 – 2000 eV with full control of polarization. Recently, a multi-technique UHV sample preparation chamber and an imaging energy filter have been added. A sophisticated acquisition software package has been developed to integrate microscope operation with insertion device and beamline operation.

The X-PEEM research program at the CLS is heavily focused on *spectroscopic* dimensions of X-ray spectromicroscopy. This presentation will describe the instrumentation and recent results from the CLS, including characterization of embrittlement mechanisms in stainless steel alloys, nano-structured semiconductor surfaces, and UPS and XPS spectroscopy of organic thin films. In the analysis of stainless steel alloys, high spatial resolution elemental mapping is combined with chemical analysis by NEXAFS spectromicroscopy for the speciation of individual grain boundary phases responsible for embrittlement.

Acknowledgements: The CaPeRS X-PEEM microscope was funded by NSERC, the province of Saskatchewan, the University of Saskatchewan, the Canadian Foundation for Innovation and the Ontario Innovation Trust. We acknowledge access to the Synchrotron Radiation Center (University of Wisconsin – Madison) funded by the National Science Foundation (DMR-0084402) and to the Canadian Light Source, funded by NSERC, NRC, CIHR, and the University of Saskatchewan.