Bulk-sensitive Hard X-ray Photoelectron Spectroscopy facility at Canadian Light Source

Q.F. Xiao[1], X.Y. Cui[1], Y.F. Hu[1] and T.K. Sham[2]

qunfeng.xiao@lightsource.ca

[1] Canadian Light Source, 44 Innovation Boulevard, S7N 0V2, Saskatoon, SK, Canada
[2] Department of Chemistry, University of Western Ontario, N6A 5B7, London, ON, Canada

A Hard X-ray Photoelectron Spectroscopy (HXPES) combined with Molecular Beam Epitaxy (MBE) system was recently commissioned at the Soft X-Ray Microcharacterization Beamline (SXRMB), a medium energy (1.7-10 KeV) beamline of Canadian Light Source. Combined with the high resolution X-ray absorption spectroscopy available at the SXRMB, high energy XPS allows for deeper penetration into a material. By controlling the incident photon energy, chemical information of the bulk and interface can be probed and the surface contamination could be avoided. It offers a powerful non-destructive technique in studying bulk and interface properties of various materials. The excellent performance of the beamline and the HXPES spectrometer is demonstrated herein using Au Fermi and 4f core lines; and the controlled probing depth of HXPES is demonstrated by tuning the photon energy (2-9 keV), in the study of a series of SiO_2/SiC multilayer samples. The electric charging effect makes the conventional XPS measurements of non-conducting samples challenging. As an application of the MBE system, to overcome the electric charging effect, the insulating SiO_2 glass was coated with a thin layer of Cr metal. Excellent HXPES results of HXPES for SiO_2 coating sample was obtained, which is compatible or better than those recorded using a Kratos spectrometer.