Inorganic Chemistry Seminar Series

Tuesday, August 27, 2019, 12:30 pm
Verna and Peter Dauterive Hall, VPD 105

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X-ray Photoelectron Spectroscopy: From the Surface into the Bulk

X-ray photoelectron spectroscopy (XPS) is based on the photoelectric effect discovered and described by Planck, Einstein and Millikan, and has its beginnings in the groundbreaking work of Kai Siegbahn, who received the Nobel Prize in Physics in 1981 for development of the technique. XPS can non-destructively probe the chemical composition, local chemical environments, and electronic structure of matter and has been applied to a vast range of materials, including solids, liquids, and gases. The most common variety of XPS uses soft X-ray sources, e.g. Al Kα at 1.5 keV, giving extremely surface sensitive results probing only the first few nanometres of a sample's surface.

Hard X-ray excitation sources with energies of up to 10 keV extend the probing capabilities of XPS beyond the outermost surface of materials by enabling detection of photoelectrons from much deeper regions. Hard X-ray photoelectron spectroscopy (HAXPES) delivers much greater probing depths of tens of nanometres, enabling the characterization of buried layers and interfaces in structured materials. It also allows the investigation of realistic samples without prior complex and time consuming surface preparation. Like XPS, HAXPES enables the study of both chemical states and electronic structure. This talk will introduce the general capabilities and selected application areas of both XPS and HAXPES, discuss challenges and opportunities that HAXPES presents and cover recent developments and results of this emerging technique.

Hosted by Professor Brent Melot

The scientific community is invited

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