



Special Colloquium Announcement

of the Collaborative Research Centre 951
"Hybrid Inorganic/Organic Systems for Opto-Electronics"

Hisao Ishii

Center for Frontier Science, Graduate School of Advanced Integration Science,
and Molecular Chirality Research Center, Chiba University, Japan

High-Sensitivity UV Photoemission Spectroscopy Using Low Energy Photons to Probe the Electronic Structures of Semiconductors, Insulators and Biomolecules

Time: Thursday, October 31, 2019, **15:15**

Place: IRIS Adlershof, Zum Großen Windkanal 6,
Room 007 (ground floor).



Collaborative Research Centre 951
Department of Physics
Humboldt-University of Berlin

Email: sfb951@physik.hu-berlin.de
Tel.: +49 30 2093 66380
www.physik.hu-berlin.de/sfb951

Partners



High-Sensitivity UV Photoemission Spectroscopy Using Low Energy Photons to Probe the Electronic Structures of Semiconductors, Insulators and Biomolecules

Hisao Ishii

*Center for Frontier Science, Graduate School of Advanced Integration Science,
and Molecular Chirality Research Center, Chiba University, Japan*

ishii130@faculty.chiba-u.jp

The information on electronic structure such as density-of-states, ionization energy, and energy level alignment of bulk and interface of various materials is a key factor to understand and improve their functions. Photoemission spectroscopy has been, so far, widely applied to many materials. The detection limit is enough to investigate valence states, but not to probe weak density of states which is practically important to device performance as trap etc. Very recently we have developed *high-sensitivity UV photoemission spectroscopy* (HS-UPS) using tunable low energy light source, achieving three orders of magnitudes lower detection limit than conventional photoemission spectroscopy. In this talk, I will report on its applications to organic and inorganic semiconductors and insulators. First topic is the observation of density-of-states including both valence top region and band tail structures for polymers, perovskite, and oxide semiconductor. Second topic is the detection of negative carrier states in organic semiconductor films and devices by using *operando*-photoelectron yield spectroscopy. Finally, I will shortly talk about our recent trial to measure the electronic structure of proteins.