Innovative Center of Nanomaterials Science for Environment and Energy (ICNSEE)
National Institute for Materials Science (NIMS)
11th ICNSEE Seminar

Date and time: 2010. Dec. 7 (Tue) 15:00-17:00
Venue: Large Seminar room, Collaborative Research Bldg., 4F, Namiki Site, NIMS

Program and Abstract:

15:00-16:00 "In situ Structural Investigation at Electrode/Electrolyte Interfaces Using Surface X-ray Scattering with Synchrotron Radiation Light"

Dr. Toshihiro KONDO
Associate Professor, Division of Chemistry, Graduate School of Humanities and Sciences, Ochanomizu University
ICNSEE Open-laboratory Visiting Researcher

Abstract: In order to fully understand the mechanisms of electrochemical reactions and to apply these reactions to modern nanotechnology such as fuel cells, sensors, and molecular devices, it is very important to know the structures at the electrode/electrolyte interfaces in situ with an atomic resolution. The surface X-ray scattering (SXS) technique is one of the best methods to investigate the three-dimensional interfacial structure at an atomic level. Using this technique, we structurally investigated the Au single crystal electrode/sulfuric acid electrolyte solution interfaces and the electrochemically deposited Ag, Pd, and Pt ultrathin layers on the Au single crystal electrodes.

16:00-17:00 "Mechanism of CO tolerance of nano PtRu catalyst with high alloying degree for polymer electrolyte fuel cells"

Dr. Tatsuya TAKEGUCHI
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ICNSEE Open-laboratory Visiting Researcher

Abstract: Since H_2 gas is usually generated by a steam reforming process of natural gas, a small amount of CO deactivates catalysts at the anode of a PEFC. It is required to develop an anode catalyst with high CO tolerance. Pt-Ru alloy is well known to have the highest CO tolerance. However, it cannot accept H_2 fuel gas with CO higher than 100 ppm. To enhance CO tolerance of PtRu catalysts, it is necessary to control the alloying degree. However, it is difficult to prepare highly alloyed and highly dispersed PtRu/C catalysts. We succeeded in preparing nano PtRu catalyst with high alloying degrees. The preparation procedure and the mechanism of CO tolerance are discussed, referring to the well-known bifunctional mechanism