Contribution ID: **163** Type: **Poster**

In situ Soft X-ray Emission Spectroscopy of Iron Phthalocyanine-based Oxygen Reduction Catalysts for Polymer Electrolyte Fuel Cells

Friday, 16 September 2011 12:23 (2 minutes)

Carbon-based catalysts such as pyrolyzed Fe phthalocyane (FePc) show high oxygen reduction reaction (ORR) activities and are expected to be cathode catalyst alternative to Pt for polymer electrolyte fuel cells. To clarify the origin of the ORR activity, we have studied the electronic structure of the catalysts under vacuum condition. However, in situ observation of the electronic structure during exposure to ambient oxygen is required since the actual catalytic process occurs at such condition.
X-ray emission spectroscopy (XES) is useful to investigate the electronic states of materials under ambient pressure. We have fabricated a sample cell for in situ XES and investigated the O2 adsorption effect to the FePc-based catalysts using ultra-high resolution soft XES station (HORNET) at BL07LSU of SPring-8.

Thin catalyst layer (˜1μm) is coated on Si3N4 membrane which separates vacuum condition from the atmospheric environment. Comparing in situ Fe 2p XES spectra under 1 atm Ar and O2 pressure, a drastic change of valence structure caused by O2 adsorption was observed. It is revealed that the adsorption site of the pyrolyzed catalysts is different from that of the precursor FePc.

Please specify the session

RIXS

Please specify poster or talk

Poster

Primary author: Mr NIWA, H (University of Tokyo)

Co-authors: Prof. OZAKI, J (Gumma University); Prof. TERAKURA, K (Japan Advanced Institute of Science Technology); Dr KAKIMOTO, M (Tokyo Institute of Technology); Dr KOBAYASHI, M (University of Tokyo); Prof. OSHIMA, M (University of Tokyo); Prof. MIYATA, S (Tokyo Institute of Technology); Dr IKEDA, T (Japan Atomic Energy Agency); Dr HARADA, Y (University of Tokyo); Dr NABAE, Y (Tokyo Institute of Technology)

Presenter: Mr NIWA, H (University of Tokyo)

Session Classification: Poster session II and lunch

Track Classification: Poster Session II (Friday)