

The role of synchrotron and neutron sources in understanding the structure of materials for H₂-storage and O-conducting materials for Solid Oxide Fuel Cells operating at low temperature

Thursday, 19 September 2013 10:30 (30 minutes)

Two classes of structurally complex materials will be discussed in this talk. The first concerns iso-structural UiO-66/67 [JACS, 2008, 130, 13850] metal-organic frameworks that showed some interest for H₂ storage and some potentialities as porous scavengers for interim radioactive waste scavenger. UiO-66/67 exhibits a different degree of long- and short-range order that has been disclosed using combined XRPD EXAFS and DFT calculations [Chem. Mater, 2011, 23, 1700; PCCP, 2012, 14, 1614; PRB, 2012 86, 125429]. The second class of materials concerns mixed oxides SrMO_{2.5+x} (M = Co or Fe) that can act as O-conducting materials for solid oxide fuel cells operating at low temperature. We followed by in situ neutron powder diffraction and EXAFS/XANES the electrochemical oxygen intercalation in the whole SrMO_{2.5+x} → SrMO_{3.0} solid state phase transition [JACS, 2006, 128, 13161; J. Phys. Chem. C, 2011, 115, 1311]. Inelastic neutron scattering highlighted that the low temperature oxygen condition mechanism inside these materials is phonon assisted [JACS, 2008, 130, 16080].

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