

MaMaSELF

Contribution ID: 14

Type: **not specified**

Structure, local environment and reactivity of metal centers hosted inside hybrid metal- organic frameworks (MOF) investigated by spectroscopies FTIR, UV-Vis, in situ XAS and high resolution XRPD.

Thursday, 23 May 2013 11:45 (30 minutes)

Metal organic frameworks (MOFs) are a class of crystalline materials constructed by assembling metal-containing centers with multi-dentate organic ligands into a one, two or three-dimensional structure. High crystallinity makes it possible to tune the pore size from several angstroms to a few nanometres by controlling the length of the ligand. The MOFs being studied are UiO-67 MOFs synthesized by the group of Prof. Karle Peter Lillerud, University of Oslo and characterized in University of Torino under the supervision of Prof.ssa Silvia Bordiga. The MOF studied comprises a Zr based inorganic building brick and benzene dicarboxylic acid as the organic linker. Pt ions have been doped into the MOF in the form of Pt-complexes in varying concentrations. Ultra-high porosities (approx. 90%) and high surface area (6000m²/g), besides the presence of nano-sized pores in the framework provides these MOFs with high potential in adsorption and catalysis. The samples are studied using FTIR spectroscopy, by sending probe molecules like CO, acetylene, ethylene etc to investigate the adsorption behaviour in time and changing equilibrium pressure as well as any modification in the chemistry of the MOF or the hosted Pt metal centers. The FTIR data will be complemented by UV-Vis spectra, DRIFTS and in-situ XAS measurements.

Structure analysis to be done by in-situ PXRD and elastic neutron diffraction.

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Session Classification: Late Morning Session Thursday