

3rd Workshop on the Simultaneous Combination of Spectroscopies with
X-ray Absorption, Scattering and Diffraction Techniques



Contribution ID: 32

Type: **Oral contribution**

Combination of HERFD XAS and ATR IR for in situ investigation of the liquid phase hydrogenation of nitrobenzene

Wednesday, 4 July 2012 14:20 (20 minutes)

Hydrogenation of nitroarenes is the industrial method to produce functionalized amines. Supported gold showed interesting features for selectivity towards the nitro-group in the presence of other reducible groups. Despite the fact that the reaction mechanism and the origin of the selectivity are well understood, the nature of the active site especially the structure and oxidation state of the Au nanoparticles during the reaction are still debated. We show that Au⁰ is the predominant oxidation state during the hydrogenation reaction by combination of HERFD XAS and ATR IR employing an in situ spectroscopy reaction cell for pressurized liquid phase batch reactions. The combination of these methods allows to follow electronic and geometric structures of the catalyst and to link it to the conversion of the substrate. By employing Au/CeO₂ precursors with a high Au³⁺ fraction we found that the conversion of nitrobenzene is not dependent on the oxidation state.

Primary author: Mr MAKOSCH, Martin (ETH Zürich)

Presenter: Mr MAKOSCH, Martin (ETH Zürich)

Session Classification: Catalysis Session 1

Track Classification: Catalysis