

Smaller than nano: latest outcomes in catalysis and electrocatalysis characterization at SAMBA.

E. Fonda, A. Zitolo

Catalysis has been tightly associated to x-ray absorption spectroscopy from the very beginning, and this happy wedding is still holding and faithful. Catalysts studied at beamlines are quite a mirror of the needs of our society: we observe a clear lowering trend on three-way catalysts, while oxygen reduction, hydrogen evolution and carbon dioxide reduction reactions are the strongest trends, and Fischer Tropsch regains a certain global interest, reflecting current issues on global warming, oil shortage and economic struggles.

Catalysts are evolving in complexity and design too: research moves from supported metallic clusters to embedded and size stabilized nanoparticles, and finally to the prosperous world of single atom catalysts that promises noble metal like performances with less noble materials.

We will illustrate a part of the activities of the beamline through examples: core shell PtPd particles embedded in ceria for hydrogen evolution, ceria/MWCNT composites for CO<sub>2</sub> reduction and we will end with a series of studies on single atom catalysts for the oxygen reduction reaction and CO<sub>2</sub> conversion.