

***Operando* Surface X-ray Diffraction Studies of Structurally-Defined Cobalt Oxide Thin Films during Oxygen Evolution**

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Since the early work about the electrochemistry of cobalt oxides in the 70-80's there is a sort of renaissance about the oxygen evolution reaction (OER) on these materials. In fact, precious metal-free OER catalysts based on transition metal oxides have been receiving outstanding interest during the past decade because OER is envisioned as one key reaction to store renewable electricity (wind and sun) into fuels. Although a vast literature exists on the subject, a better information about the atomic-scale interface structure, especially the nature of the active sites and the local reaction rates, is desired to improve our understanding of OER and possibly design better catalysts.

After an introduction about current knowledge about OER catalysis on cobalt oxides, I will present *operando* surface X-ray diffraction studies of two structurally well-defined cobalt oxides compounds – thin epitaxial films of $\text{Co}_3\text{O}_4(111)$ and $\beta\text{-CoOOH}(001)$. By monitoring structural changes during cyclic voltammograms up to OER current densities as high as 150 mA cm^{-2} , I will show that we are in position to discuss the structure of the catalytic sites and their OER activity. I will also discuss the large pseudo-capacitive current measured before OER, which is at the origin of the use of cobalt oxides as materials for supercapacitors.