

NiFe nanoalloyed and nanogranular thin films for Oxygen Evolution Reaction catalysis

Speaker:

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The production of Hydrogen, the best alternative to fossil fuels, can be achieved through the electrochemical water splitting, consisting in two half reactions: the oxygen evolution reaction (OER) and the hydrogen evolution reaction, where O₂ and H₂ are obtained from water molecules. OER is the most thermodynamically demanding part, representing the bottleneck of the entire process. Nanoalloyed materials can overcome the water splitting limitations by serving as OER catalysts, whose efficiency depends on their morphology and chemical composition.

We employ the Supersonic Cluster Beam Deposition to synthesize new OER electrocatalysts, consisting in films with thickness in the 15-88 nm range and composed of NiFe alloy nanoparticles (90%/10% weight fraction). We characterize the freshly deposited films and track their morphological and chemical transformation during the catalytic activity by means of AFM, SEM, XPS and optical spectroscopy. The electrochemical tests reveals that the OER catalytic efficiency is excellent and independent of the film thickness, identifying the thinnest films as the most promising low-cost catalysts.

PhD Seminar

18th January 2023

Sala Riunioni S5, 16.40-17.10

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