

MATERIALS SCIENCE AND TECHNOLOGY

DISAT - Functional Water-Splitting Electrocatalysts for Integrated Energy Conversion Devices

Funded By	Dipartimento DISAT
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Context of the research activity	This PhD project is part of a European collaborative initiative developing integrated CO₂-to-methanol conversion systems. The research focuses on advanced electrocatalysts for water splitting, particularly the oxygen evolution reaction (OER), a key limitation in electrolyzer efficiency. Activities include the development, characterization, and integration of sustainable electrocatalytic materials, as well as the investigation of performance, stability, and degradation mechanisms under operating conditions.
Objectives	The PhD candidate will contribute to the development of advanced electrocatalysts for water-splitting technologies, with a particular focus on the oxygen evolution reaction (OER). The research will focus on the design, synthesis, characterization, and performance evaluation of electrocatalysts aimed at improving the efficiency, durability, and scalability of electrodes. The main research activities will include: • Synthesis and optimization of non-noble, Earth abundant catalysts or catalysts with reduced noble metal content; • Investigation of the influence of composition, morphology, and nanostructure on electrocatalytic performance; • Physicochemical characterization of the prepared materials using microscopic, spectroscopic, and structural analysis techniques; • Electrochemical evaluation of catalytic activity in three-electrode cell measurements; • Assessment of catalyst stability and degradation phenomena under prolonged operation; • Investigation of structure–property relationships affecting catalyst activity and stability; • Analysis and interpretation of experimental data, preparation of scientific reports and publications, and presentation of results within the project consortium and at scientific conferences.
Skills and competencies	The ideal candidate should have: • M.Sc. in Chemical or Materials Engineering, Materials Science, Chemistry, or closely related disciplines; • Basic knowledge of electrochemistry and electrocatalysis preferably

**for the
development of
the activity**

acquired during the M.Sc. project;

- Curiosity, proactivity, and problem-solving skills;
- Independence in performing basic laboratory activities and in scheduling research activities;
- Good command of written and spoken English.