

MATERIALS SCIENCE AND TECHNOLOGY

PNRR - Innovative nanostructured electrocatalysts for Green Hydrogen production through Water Electrolyzers

Funded By	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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Context of the research activity	<p>The Paris Agreement aims to mitigate global warming by keeping the global temperature rise below 2°C. To achieve this, it is needed to decrease greenhouse gases emission and boost renewable energy production. Unfortunately, the intermittent nature of most renewable sources, such as sun and wind, requires proper energy storage for successive energy use. Water electrolysis is a well-known process that can be employed to produce a fuel, hydrogen, starting from water and (renewable) electricity.</p> <p>Progetto finanziato nell'ambito del PNRR - M4C2, Investimento 1.5 - Avviso n. 3277 del 30/12/2021 - ECS00000036 Nord Ovest Digitale E Sostenibile (NODES) - CUP E13B22000020001</p>
Objectives	<p>The Paris Agreement aims to mitigate global warming by keeping the global temperature rise below 2°C. To achieve this goal, it is needed to decrease greenhouse gases emission and boost renewable energy production. Unfortunately, the intermittent nature of most renewable sources, such as sun and wind, requires proper energy storage for successive energy use. Water electrolysis is a well-known process that can be employed to produce a fuel, hydrogen, starting from water and (renewable) electricity.</p> <p>Electrocatalysts are important components of an electrolyzer as they contribute to lower the energy consumption by minimizing the kinetic barriers of the two half-reactions taking place, i.e. the hydrogen and oxygen evolution reaction (HER/OER). The development of innovative electrocatalysts for these two reactions that combine high activity, stability, and low amount of noble metals will allow for a further spread of the water electrolysis technologies.</p> <p>The candidate will synthesize, characterize, and test electrocatalysts for HER/OER. In particular, the objectives of this project include:</p> <ul style="list-style-type: none">• Synthesis of HER/OER electrocatalysts;

	<ul style="list-style-type: none">¿ Characterization of the materials by microscopic and spectroscopic tools;¿ Screening of the activity/stability of the prepared catalysts in a three-electrode cell;¿ Fabrication of Membrane Electrode Assemblies (MEAs) and test in a device.
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Skills and competencies for the development of the activity	<p>The ideal candidate should have:</p> <ul style="list-style-type: none">¿ M.Sc. in Engineering / Materials Science / Chemistry / Nanotechnologies / Physics;¿ Basic knowledge of electrochemistry or strong interest in learning electrochemical techniques;¿ Curiosity, proactivity, and problem-solving skills;¿ Independence in performing basic laboratory activities;¿ Fluent English.
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