SUSTAINABLE MATERIALS, PROCESSES AND SYSTEMS FOR ENERGY TRANSITION

Electrocatalysts for key reactions (CO2RR, CORR, HER, OER, ORR) in the energetic transition, and their characterization with advanced technologies

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Context of the research activity	In order to achieve the ambitious targets set up in Paris (December 2015) by the COP21 assembly of 195 Countries to cope with the global warming effect, of cutting-edge technologies are currently under development. Among the others, future generations of processes and systems aimed (i) to ensure the reduction of anthropic carbon dioxide through capture, storage and valorization, (ii) to develop technologies for hydrogen production, storage and use, and (iii) to improve the efficiency in the use of renewable feedstocks within a circular economy perspective, should be investigated. All these aspects can be faced by developing optimized catalysts for the key reactions (CO2RR, CORR, HER, OER, ORR) involved in the framework of the energetic transition, and by exploiting advanced characterization techniques able to shed light into the different reaction mechanisms.
Objectives	Scholarship funded by Istituto Italiano di Tecnologia (IIT) Main seat to carry out the research: CENTER FOR SUSTAINABLE FUTURE TECHNOLOGIES, ISTITUTO ITALIANO DI TECNOLOGIA, Torino Supervisors: Fabrizio Pirri (fabrizio.pirri@iit.it, fabrizio.pirri@polito.it) - Angelica Chiodoni (angelica.chiodoni@iit.it) The objectives of this PhD are: • Synthesis and optimization of novel, selective, low-cost, and green catalyst materials for the energetic transition. Among others, catalyst based on transition metal oxides, and organic catalysts, will be considered. • Characterization of the prepared catalysts with advanced characterization techniques to investigate the catalysts' performance The main site of work will be the Center for Sustainable Future Technologies

	of Ilt in Turin

Skills and competencies for the development of the activity	The ideal candidate should be a material scientist, a chemical engineer or a physicist. Expertise in electrochemistry, advanced processes and nanotechnologies, as well as problem solving ability and practical experience in laboratory would be an additional value. Candidates should have a strong motivation to learn through advanced research.