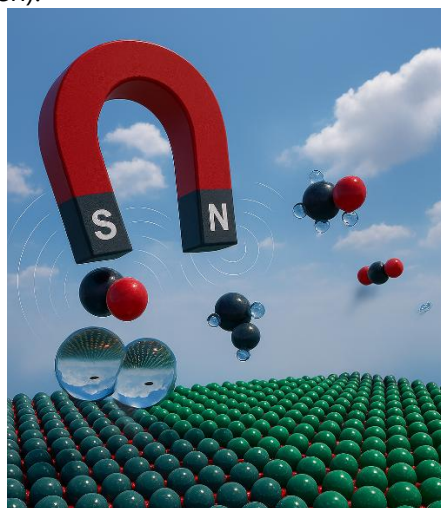


New magnetic catalysts for green chemistry applications

PhD cycle XXXXII (position co-funded by CNR-IOM)

Within the framework of the energy transition toward renewable energy sources, great attention is being devoted to catalysis and, more generally, to the study of catalytic reactions that optimize the production of green energy carriers such as hydrogen, methanol, ammonia, and others. In this context, research is moving in several directions by exploring innovative solutions. Among these, the application of a magnetic field during a catalytic reaction can give rise to phenomena that are still under fundamental exploration, which are included in the field of the so-called magnetocatalysis (or spin-catalysis). This new frontier of chemistry is attracting an increasing interest and holds promise for improving key processes for the energy transition, such as water electrolysis. In this PhD project, the synthesis, characterization, and functionality of new magnetic catalysts will be investigated. In addition to laboratory techniques such as XRD, SEM, XPS, and IR spectroscopy, the project includes the use of so-called *operando* techniques exploiting the Synchrotron radiation, which allow the evolution of chemical reactions to be studied at the molecular level, with a degree of detail inaccessible to laboratory-based techniques. The PhD candidate will work in a highly international environment at the APE-HE beamline of the Elettra synchrotron and will have the opportunity to carry out experiments at other international research infrastructures. In addition, there is the possibility of spending a study period at Lund University (Sweden).



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