

SINCHEM PhD subject

Production of Solar Fuels using CO₂

Home institution: University of Messina (Prof. S. Perathoner, Prof. G. Centi)

1st Host institution: CPE Lyon (Dr. Elsje Alessandra Quadrelli)

2nd Host institution : Industrial partner, to be defined

Recently emerged a critical interest in the scientific community for the use of recycled CO₂ to produce fuels using renewable energy. There is therefore the need to develop suitable technologies for an efficient conversion of renewable (solar) energy into fuels. This means that a technology is needed which uses solar energy and CO₂ to produce H₂ and easily storable liquid fuels.

The objectives of the PhD thesis range from the comprehension of the fundamental aspects of production of solar fuels, through the understanding of the concept how it is possible to produce solar hydrogen and fuels from carbon dioxide towards the concept of “artificial leaves” going finally to the practical aspects regarding experiments of photo-electrocatalysis for the conversion of CO₂ (home institution, University of Messina) and the preparation as well as the characterization of colloidal noble metal nanoparticles deposited on solid semiconductors (e.g. TiO₂) as the catalysts.

In order to achieve the objective it will be necessary that the student will attend courses and research laboratories at the home institution (University of Messina) and stay at the 1st host institution (CPE – Lyon) for deepening of the preparation skills of the colloidal noble metal nanoparticles based catalysts. Moreover it is also foreseen a stage at an industrial partner institution.