



SINCHEM PhD subject

Production of Solar Fuels using CO₂

Home institution: CPE Lyon (Dr. Elsje Alessandra Quadrelli and, Chloé Thieuleux)

1st Host institution: University of Messina (Prof. S. Perathoner, Prof. G. Centi)

2nd Host institution : Industrial partner, to be defined

Suitable technologies are needed for an efficient conversion of renewable (solar) energy into fuels. The use of recycled CO₂ to produce such fuels photocatalytically has recently sparked a strong interest in the scientific community.

The objective of the PhD thesis is the design and development of multifunctional materials for photocatalytic electrodes enabling 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 preparation as well as the characterization of colloidal noble metal nanoparticles deposited on solid semiconductors (e.g. TiO₂) as the catalysts and the conception of related hybrid material (Home institution, University of Lyon) to the practical aspects regarding experiments of photo-electrocatalysis for the conversion of CO₂ (host institution, University of Messina).

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 Lyon) and stay at the 1st host institution (CPE – Lyon) for deepening of the understanding of the principle of photocatalysts. Moreover, a stage at an industrial partner institution it foreseen.