

SINCHEM PhD subject

Biomass valorization for production of bio-fuel additives

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

1st Host institution: ENSCM – Institut Charles Gerhardt Montpellier (Dr. Françoise Quignard, Dr. F. di Renzo)

2nd Host institution : Industrial partner

The objective of this project is to form a PhD student with competences in the field of biomass valorization for production of fuel additives. The starting material should be cellulose, the most abundant component of lignocellulosic biomass, which can be catalytically depolymerized/hydrolyzed to glucose, which is subsequently isomerized and dehydrated into 5-hydroxymethyl-furfural (HMF).

HMF obtained through acid catalyzed dehydration of sugars derived from 2nd generation lignocellulosic materials is considered as a platform molecule for production of valuable fuel additives or precursors, like levulinic acid and γ -valerolactone (GVL), 5-(etossi-metil)-furan-2-carbaldehyde (EMF), 2,5 dimethylfurane, etc. useful either to improve biodiesel as bioethanol based fuels.

Both steps (cellulose hydrolysis as sugar dehydration) are based on heterogeneous catalytic processes, therefore the PhD student will be introduced to the main skills in synthesis of solid catalysts, as well as their advanced characterization and reactivity tests at both Messina University (home institution) and University of Montpellier (host 1 institution) and at the involved industry (host 2 institution).

The project forecast is to form a student for approximately two years at the University of Messina and one year at the Institute Charles Gerhardt in Montpellier. A training stage will be performed at the involved industrial partner institution.