





Istituto di Chimica dei Composti Organometallici

ICCOM Pisa incontra ICCOM Firenze

Venerdì 16 Novembre 2018 Alle ore 11:00

presso Aula 28, Edificio A - Piano terra Area della Ricerca CNR, Via Moruzzi 1 - Pisa

La Dr.ssa Francesca Liguori di ICCOM-Firenze terrà il seguente seminario:

"Heterogeneous catalysts for sustainable fine-chemical production"

Dr. Francesco Vizza ICCOM-CNR

Abstract:

Most industrial syntheses of fine-chemicals are still performed with classic organic reactions by multistep batch processes, using sophisticated reagents, protective groups or additives which are needed for highly selective transformations. As a result, among all industrial segments, pharmaceuticals and fine-chemicals show the highest E-Factors (Kg of waste/Kg product). In order to devise low-impact processes, a number of requirements to be fulfilled were indicated, which are acknowledged under the name of "The Principles of Green Chemistry". Heterogeneous catalysts have a great potential for process intensification both in terms of improved efficiency (space-to-time-yield, atom-economy), minimal number of energy consuming steps (separation and purification), ease of reuse as well as integration in reactor equipments while reducing the production of waste of the overall processes. Among these, bifunctional catalysts combining both supported acid- and metal sites enabling multiple reaction sequences in one-pot may promote a range of important reactions typical of organic catalysis (e.g. condensation, dehydration) with those characteristic of metal-mediated activators (e.g. hydrogenation) in cascade or in a cooperative way, thus to be particularly attractive. Furthermore the use of unconventional monolithic catalysts integrated in continuous flow reactors, can be considered extremely useful for the synthesis of fine-chemicals because of the improved mass and heat transfer, a lower pressure drop, a uniform residence times distribution and a higher selectivity, compared to packed-bed setups.

Biographic sketch:

Francesca Liguori got her Master Degree in Chemistry at the University of Florence (Italy) in 1999 with a thesis about the synthesis of heterocyclic alkaloids. After some Post-Degree Research Collaborations at the Department of Organic Chemistry (University of Florence) and a Research Collaboration with IEO-European Institute of Oncology (Milan) on the synthesis of derivatives of biotin for radiotherapy, she got an Internship in Pharmaceutical Industry "L. Molteni" in the sector of Quality Assurance. She got her PhD in Chemistry in 2005 at the University of Florence with a thesis about the synthesis of gangliosides, mimetic of



antitumor antigens. In 2006 she collaborated with the Institute ISMAC-CNR (Milan) as a Post-Doctoral Fellow, working on the synthesis of ethylene based copolymers with anti-oxidant activity. From 2007 to 2011 she was Grant-Holder at the Institute ICCOM-CNR (Florence, Italy), working on heterogeneous catalysts for selective hydrogenation reactions in catalytic membrane reactors. Since 2011 she is Permanent Researcher at ICCOM-CNR (Florence, Italy). She participated as Researcher in several Industrial Projects (Solvay Speciality Polymers SpA; Nippon Kodoshi Corporation), as Researcher and Tutor for PhD students in European Projects [Network of Excellence IDECAT (2008-2010) and NANO-HOST-ITN (2009-2012)] and as Researcher in several Research Contracts (2015-2017) in the sector of Green Chemistry. Currently her research interests mainly concern the synthesis of heterogeneous catalysts based on metal-complexes or metal-nanoparticles immobilized onto various supports (resins, polymers, membranes, inorganic materials) and their use for selective, sustainable processes in batch and in flow reactors. She is co-author of 28 peer-reviewed papers on ISI journals, 5 Patents; co-editor of 1 book with ISBN and several communications to international congresses.