



SINCHEM PhD subject

Development of innovative catalysts and processes for the synthesis of monomers for bio-polymers

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HOST INSTITUTION 1: LYON 1 university – C2P2 Unit, France. Supervisors of the PhD student in Lyon: Prof. Alessandra Quadrelli.

HOST INSTITUTION 2: UCL (UK) Supervisor Prof. Gavriilidis (Chem. Eng. Department in UCL), Dr. Nikolaos Dimitratos.

PROJECT DETAILS

This project is aimed at the ***development of innovative catalysts and processes for the synthesis of monomers for bio-polymers, starting from 5-hydroxymethylfurfural (HMF)***. Since the combination of different types of catalyst functionalities may offer a wider range of opportunities in terms of substrate activation and transformation, various systems based on homogeneous and heterogeneous catalysts will be designed and tested. New materials will be tested for these reactions using reactor equipment and analytical methods that are available at the Bologna laboratories. A careful characterization before and after the catalytic tests will be performed in collaboration with **LYON University (France) and Harwell (UK)**. In particular, spectroscopic methods will be used for the study of the interaction between catalysts surface and probe molecules. At Harwell, advanced characterization of the synthesised materials from the corresponding project could be performed using synchrotron and neutron scattering-based techniques. Moreover, since microreaction technology is an interdisciplinary field that has gained significant momentum in recent years due to the numerous advantages it offers compared to conventional systems in terms of enhanced heat and mass transfer and safer operation **UCL (UK)** will bring its expertise in microreaction technology by using microstructured quartz reactors and developing new types of microstructured reactors for the studied reactions. The experimental efficiency achieved through the well-defined conditions offered by microchannel reactors will be utilised in this project to elucidate intrinsic reaction kinetics. Moreover, the possibility for advancing catalytic process development by combined application of microstructured flow reactors with techniques for in situ catalyst characterization and mathematical optimization will be explored.