

REALCAT: A new high-throughput platform dedicated to the design of biorefineries catalysts

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Catalysis under all of its forms (chemo-, bio- or hybrid catalysis) is of crucial importance in domains such as Environment, Food, Health, Energy, which are at the inner core of the current societal demands. The development of new catalysts with improved performances is therefore a highly strategic issue. However, the experimental part of this work is time- and money-consuming, as traditional “trial and error” methods for synthesizing and testing catalysts are still needed.

In this lecture the advanced high-throughput (HT) REALCAT platform¹ will be described and the first results obtained using it will be presented. REALCAT is a unique in the world, highly integrated platform devoted to the acceleration of innovation in the field of catalytic processes with a focus on biorefineries. REALCAT represents a top-level HT technologies workflow including (i) robots for the automated synthesis of catalysts, (ii) rapid characterization tools and (iii) parallel reactors combined with ultra-fast analytical tools. Three laboratories of the University of Lille have gathered their forces in this challenging project: UCCS, specialized in chemo-catalysis; the Charles Viollette Institute (ProBioGEM team), specialized in bio-catalysis and CRISTAL, a lab specialized in computer engineering and data treatment. This combination of skills is a key point of the project. In this lecture a focus will be put on the possibilities for researchers in the field of catalysis to get an access to the tremendous potential of REALCAT.

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Sébastien PAUL is Professor at the Ecole Centrale de Lille, a generalist engineer school in the north of France, where he is the head of the Sciences of the Matter department. He obtained his PhD in Chemical Engineering at the University of Technology of Compiègne, France in 1996. Since then, his research work is carried out in the Unité de Catalyse et de Chimie du Solide (UCCS - UMR CNRS 8181), France. He is a member of the VALBIO group (standing for Valorization of the ALkanes and of compounds issued from the BIOMass) led by the Prof. Franck Dumeignil. Sébastien PAUL is the scientific leader and the user committee chairman of the REALCAT project ('Advanced High-Throughput Technologies Platform for Biorefineries Catalysts Design') and he is deputy-director of the Franco-Japanese International Associate CNRS Laboratory CAT&P4BIO (Innovative Catalysts for Oxidation Reactions and Processes, Biomass Conversion). He is involved in the development of a large variety of catalytic processes starting from compounds issued from biomass or hydrocarbons in the frame of academic and industrial collaborations. Finally, he has supervised or co-supervised 15 PhD, 11 post-docs, is co-author of more than 50 scientific articles, 10 patents, and more than 100 communications (oral and posters)