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Catalysis for the production of furanic derivatives

The concepts of sustainable development, bio-economy and circular economy are increasingly being applied to the synthesizing molecules of industrial interest. Among these molecules, furfural as a platform molecule is the subject of various research approaches to improve its synthesis and productivity and also to extend its transformation for the production of molecules of interest. Due to the current momentum in promoting green chemistry for sustainable development, chemists have recently established catalytic reactions based on alternative technologies such as continuous flow. The present study showed recent break through obtained in the production of furfural, hydroxymethylfuran, methylfuran, methyl levulinate and γ-valerolactone starting from lignocellulose in the presence of homogeneous catalysts and heterogeneous catalysts using either batch process or continuous flow process. Various reaction parameters in dependence of time such as temperature, catalyst and feedstock loadings as well as solvent types have been optimized. Conception, synthesis and physico-chemical properties will be detailed. Continuous flow transformation of biomass will pave the way to green chemistry applied to the production of biofuel.

Recent Publications

1. C Len, et al, (2017) Sulfonated Sporopollenin as an efficient and recyclable heterogeneous catalyst for dehydration of D-xylose and xylan into furfural. ACS Sustainable Chem. Eng. 5(1):392-398.
2. C Len, et al. (2017) Sustainable pathway to furanics from biomass via heterogeneous organo-catalysis. Green Chem. 19:164-168.
3. C Len, et al. (2016) Conversion of xylose, xylan and rice husk into furfural via betaine and formic acid mixture as novel homogeneous catalyst in biphasic system by microwave-assisted dehydration. J. Mol. Catal. A: Chemical 423:520-525.
4. C Len, et al. (2016) Furfural production from D-xylose and xylan by using stable Nafion NR50 and NaCl in a microwave-assisted biphasic reaction. Molecules 21(8): 1102.
5. C Len, et al. (2015) Microwave-aided dehydration of D-xylose into furfural by diluted inorganic salts solution in a biphasic system. J. Mol. Catal. Chemical 410:1-7.

Biography

Christophe Len is currently a Professor at the Université de Technologie de Compiègne – UTC (France) and he develops his research at Chimie ParisTech, France. His current research explores organic chemistry and catalysis applied to biomass. He has published 170+ original publications. Among recent awards and recognition to his scientific career, he was promoted Fellow of the Royal Society of Chemistry (FRSC, 2015) and was honored with the 2017 Glycerine Innovation Award sponsored by the American Cleaning Institute and the National Biodiesel Board.

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