

Secteur des Sciences et Technologies

Invitation à la soutenance publique de thèse de Hussein HUSSEIN Master Sciences, Technologies, Santé, Mention " Chimie «

Pour l'obtention du grade de Docteur en sciences

« Upgrading of glycerol to solketal over metal-impregnated silicates via tuning of the hydrophilic-hydrophobic balance »

qui se déroulera le lundi 17 mai 2021 à 9h30 En visioconférence 1348 Louvain-la-Neuve

Jury members :

Prof. Michel Devillers (UCLouvain), supervisor Prof. Carmela Aprile (Unit of Nanomaterials Chemistry, UNamur), supervisor Prof. Eric Gaigneaux (UCLouvain), chairperson Prof. Damien Debecker (UCLouvain), secretary Prof. Sophie Hermans (UCLouvain) Prof. Michiel Dusselier (Center of Sustainable Catalysis and Engineering, KULeuven, Belgium) Prof. Leonarda Liotta (CNR, Italy)



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The attention paid nowadays to the production of biomass-based products such as biodiesel has led to an oversupply of glycerol. One of the relevant paths for the conversion of glycerol into a valueadded chemical is represented by its acetalization with acetone to yield solketal in presence of efficient heterogeneous catalysts represented by metal-substituted mesoporous materials.

The aim of this doctoral project is to synthesize and extensively characterize novel categories of mesoporous metal-impregnated silicates embedding Ga, Nb and Sn inserted as single-site in the silica matrix, displaying a combination of Lewis and/or Brønsted acidity. In an attempt to modulate and improve the catalytic activity of these catalysts, the possibility of controlling the surface hydrophilic-hydrophobic balance as well as the strength and concentration of acid sites has been employed as a tool for the catalytic evaluation of the mesoporous catalysts in the context of glycerol conversion. The importance of these properties lies in determining the interaction of the active species with the support and influencing the active acid sites dispersion from one hand, and in mastering the interaction of the catalyst itself with the reactants/products. Besides, a systemic study is devoted in this research to synthesize new catalytic materials with more controlled characteristics defined as methyl functionalized metal-silicates. The control of surface polarity through surface functionalization appeared to be an efficient way to optimize the overall catalytic performance and to highlight the beneficial role of hydrophilichydrophobic balance in the course of the acetalization reaction.