Secteur des Sciences et Technologies

Invitation à la soutenance publique de thèse de

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Master en Sciences chimiques à finalité approfondie

**Pour** l'obtention du grade de Docteur en sciences

« Porous Silica Coating Methodology for the Production of Sintering Resistant Catalysts »

qui se déroulera

le jeudi 11 juin 2020 à 15h

Par visioconférence

1348 Louvain-la-Neuve

Jury members :

Prof. Sophie Hermans (UCLouvain), supervisor
Dr. Vincent Dubois (Labiris, Belgium), supervisor
Prof. Eric Gaigneaux (UCLouvain), chairperson
Prof. Olivier Riant (UCLouvain), secretary
Prof. Michel Devillers (UCLouvain)
Prof. Carmela Aprile (UNamur, Belgium)
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Producing high added-value chemicals from biomass is a promising strategy to replace fossil fuels within a sustainable economy context. Lignocellulosic biomass, which is the most abundant form of terrestrial biomass, is typically composed of cellulose, hemicellulose and lignin. However, although many biomass conversion technologies have emerged in the last few decades, high conversion and selectivity in biomass processes are still challenging. Moreover, multiple refining steps are often required to produce high-value chemicals. Since glucose is a platform molecule that can efficiently be converted into fuels and various chemicals such as sorbitol, HMF or gluconic acid, the selective hydrolysis of cellulose into glucose represents a key reaction in cellulose valorization. Nevertheless, conventional processes involving the use of mineral acids are subject to some limitations such as reactors corrosion and waste disposal. Lignin, which is mainly being used as a low-grade energy source, also possesses a great potential to be used as renewable feedstock. Before its use as biofuel, lignin is first decomposed into bio-oil, considered as an alternative to petroleum-based sources. Nevertheless, since bio-oil contains up to 35 wt% oxygen that confers unfavorable characteristics for a straight use as fuel, upgrading of bio-oils via hydrodeoxygenation (HDO) is an unavoidable step in the biofuel production. In this context, heterogeneous catalysts have been shown to be extremely useful for these biomass valorization key steps. Unfortunately, deactivation is fast in biomass processing, and in particular sintering of active phase. Therefore, we have developed a catalysts protection methodology based on the coating of carbon-supported catalysts by mesoporous silica/aluminosilicate layers. This approach allows the production of a large range of sinter-resistant catalysts that will be tested in three biomass model reactions: oxidation of glucose, hydrolysis of cellobiose (a model-compound of cellulose) and hydrodeoxygenation of phenol (a model-compound of lignin).