GreenSolRes

Deliverable 2.16

Report on catalyst performance supporting the decision of achievement of milestone 5

Demonstration of solvent and resin production from lignocellulosic biomass via the platform chemical levulinic acid

The project leading to this application has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 720695

Bio-based Industries Consortium

BIO-BASED INDUSTRIES Public-Private Partnership

Horizon 2020 European Union Funding for Research & Innovation

About GreenSolRes

The need to establish economic and sustainable large-scale operations for the conversion of renewable resources to chemical building blocks is becoming increasingly urgent in the context of climate change and depleting fossil fuel reservoirs. Pathways for manufacturing of bio-based fuels and chemicals have been developed but most of them rely on sugar and starch crops for feedstock. GreenSolRes aims at a sustainable and competitive industrial production of the platform chemical levulinic acid (LVA) from lignocellulosic wastes and residues originating from forestry and agricultural sector. Further, the conversion of LVA into industry relevant building blocks γ-valerolactone (GVL), 1-methyl-1,4-butanediol (MeBDO) and 2-methyltetrahydrofuran (2-MTHF) will take place by new catalytic methods developed during the course of this project. Finally, these chemicals will be upgraded to solvents and resin monomers for the production of high added value adhesives and consumer products. This project was started in September 2016 and has a duration of five years.

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Hybrid Catalysis

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Publishable Summary

Selected catalytic systems were investigated and tailored for the multi-step hydrogenation of levulinic acid (LVA) to γ-valerolactone (GVL) and 1-methylbutane-1,4-diol (MeBDO). In the comprehensive scientific approach, the established molecular catalysts were tested in dedicated high-pressure autoclave systems, with a focus on catalyst performance and recycling efficiency. Research progress concerning the variation of the ligand structure lead to significant advancements in the catalyst activity for the hydrogenation of LVA. Subsequently, different recycling strategies for the developed molecular catalysts were investigated. Based on this approach an optimal catalyst system with adapted recycling strategy could be identified and characterized according to established criteria.