



Between homogeneous and heterogeneous catalysis: Catalyst design as key element of an efficient use of renewable carbon resources



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Renewable carbon feedstocks such as biomass and CO₂ present an important element of future circular economy. Especially biomass as highly functionalized feedstock provides manifold opportunities for the transformation into attractive platform chemicals. However, these resources require novel paradigms in process design. Fossil feedstocks are processed in stationary gas-phase processes at elevated temperature. On the contrary, biorefineries are based on processes in polar solvents at moderate conditions to selectively deoxygenate the polar, often thermally instable and high-boiling molecules. Considering “green electrons” provided by renewable energy technologies, also dynamic (electro)catalytic processes become attractive as key technology of a throughout circular economy.

Herein, novel concepts in catalyst design will be discussed focusing on solid molecular catalysts for CO₂ activation, novel biomass transformations as well as the future role of a potentially electrified biorefinery.

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| 75 186.207 Re Rhenium | 32 72.64 Ge Germanium | 7 14.00674 N Nitrogen | 16 32.066 S Sulfur | 5 10.811 B Boron | 92 238.0289 U Uranium | 111 [272] Rg Roentgenium |
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