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Influence of Gold Nanoparticles on NiAlZr Type Layered Double Hydroxide for the Catalytic Transfer Oxidation of Biomass Derived Aldehydes

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Abstract : In recent decades, the world's population has rapidly increased annually, resulting in the consumption of huge amounts of conventional non-renewable petroleum-based resources at an alarming rate. The scarcity of such resources will shut down the corresponding industries and consequently have negative effects on the well-being of humanity. Accordingly, to combat the forthcoming crises and to serve the ever-growing demands, seeking potentially sustainable resources such as geothermal, wind, solar, and biomass has become an active field of study. Currently, lignocellulosic biomass, one of the world's most plentiful resources, is acknowledged as a cost-effective material that has drawn great interest from many researchers since it has substantial energy potential as well as containing useful C5 and C6 sugars. These C5 and C6 sugars are the key reactants for the production of the valuable 16-platform chemicals such as 5-hydroxymethyl furfural, furfural, levulinic acid, succinic acid, and fumaric acid, all of which are crucial intermediates for synthesizing high-value bio-based chemicals and polymers. Succinic acid (SA) has been predicted to make a significant contribution to the global bio-based economy soon since it serves as a C4 building block that is used in a wide spectrum of industries, including biopolymers, solvents, and pharmaceuticals. In the present work, we modify the HDL MgAl with Zr to try to create acid sites on the supports and deposit gold by deposition precipitation with urea with a low gold content (0.25%). The catalyst was used to produce succinic acid by selective oxidation of furfuraldehyde with hydrogen peroxide under mild reaction conditions.

Keywords : hydrotalcite, catalysis, gold, biomass, furfural, oxidation
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