

Catalytic Furfural Hydrogenation in Solution-Phase

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With the increasing demand for eco-friendly products and the associated replacement of petroleum-based chemicals, the interest in biomass conversion has also increased. As unsaturated oxygenate species are abundant in decomposed biomass components, the catalytic conversion of biomass derivatives, such as heterocyclic molecules containing alcohol or aldehyde moieties, is important not only for the energy industry but also to improve the fundamental understanding of various catalytic processes. Furfural (FAL) as a model compound is catalytically converted into furan (F), tetrahydrofuran (THF), 2-methylfuran (MF), furfuryl alcohol (FA), and tetrahydrofurfuryl alcohol (THFA) through distinct reaction pathways depending on the type of catalysts and their surface properties. Various nanocatalysts including metal and metal oxide nanoparticles with controlled shape and size, porous materials with highly ordered pore structures as supports, and metal-organic frameworks are diversely used and the role of nanocatalysts is demonstrated in furfural hydrogenation.