

레블린산의 수소화반응을 통한 녹색 용매 및
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γ -valerolactone (GVL) and 2-methyltetrahydrofuran (2-MTHF) obtained from the hydrogenation of levulinic acid (LA) are essential value-added chemicals with potential applications as fuel additives, precursors for valuable chemicals, and polymer synthesis. Herein, different monometallic, bimetallic catalysts supported on alumina (Ni, Cu, Co, Ni-Cu, Ni-Co) and transition metal phosphide catalysts (Ni_xCo_yP) were prepared for the solvent-free hydrogenation of LA to GVL and 2-MTHF. GVL production involves the single-step dehydration of LA to an intermediate, followed by hydrogenation of the intermediate to GVL. The further hydrogenation and dehydration of GVL lead to the formation of 2-MTHF. Ni-based catalysts were found to have a higher conversion of LA while the secondary metals contributed to the selective synthesis of GVL and 2-MTHF. The solvent-free hydrogenation process described in this study impels the future industrial production of GVL and 2-MTHF from LA.