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Characterization and Catalytic Properties of Molybdenum Supported on Nano Gamma Al₂O₃ for Upgrading of Anisole Model Compound

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Abstract

The conversion of anisole, a prototypical compound representative of lignin-derived bio-oil, was catalyzed by molybdenum supported on nano gamma alumina catalyst in a flow reactor at 623–723 K, 8 bar pressure and space velocity of 6 (g of anisole)/g of catalyst× h). Mo supported nano gamma Al₂O₃ is synthesized by impregnation method and its physicochemical properties are characterized by XRD, FESEM, EDS and BET techniques. For investigation and evaluation of the support effect, regular gamma support is used for synthesis a catalyst at optimum loading in order to compare the performance of nano gamma alumina supported catalyst. Catalytic upgrading of anisole over Mo supported nano gamma Al₂O₃ represented that this type of catalyst is active to form benzene by hydrodeoxygenation (HDO) reaction, phenol by hydrogenolysis, 2-methylphenol by transalkylation, to 2,6- dimethylphenol and 2,3,5,6-tetramethylphenol by alkylation. Experimental analysis revealed that increasing the Mo loading to 20% enhances the

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