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Majid Saidi, Behnam Rahzani, Mohammad Reza Rahimpour

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Characterization and Catalytic Properties of Molybdenum Supported on Nano Gamma Al_2O_3 for Upgrading of Anisole Model Compound

Majid Saidi[1], Behnam Rahzani[2], Mohammad Reza Rahimpour[2,3*]

[1] *Faculty of Engineering, Shahrekord University, Shahrekord, Iran*

[2] *Department of Chemical Engineering, Shiraz University, Shiraz 71345, Iran*

[3] *Department of Chemical Engineering, University of California, Davis, California 95616, United States*

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 Al_2O_3 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 Al_2O_3 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

* Corresponding authors:
rahimpor@shirazu.ac.ir, mrahimpour@ucdavis.edu (M.R. Rahimpour).
m.saidi@eng.sku.ac.ir (M. Saidi).