

## Bio-Glycerol Acetalization for Highly Ordered Mesoporous Metal Oxides as Solid Acid Catalysts

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Glycerol is produced at a large amount as a 10% by-product from biodiesel production via transesterification reaction. Therefore the development of new outlets from waste glycerol to value-added chemicals is of great importance to enhance the economic profitability of biodiesel. In the present work, acetalization of glycerol has been carried out using highly ordered mesoporous metal oxides such as meso-MoO<sub>2</sub>, meso-WO<sub>3</sub>, meso-SnO<sub>2</sub>, meso-Co<sub>3</sub>O<sub>4</sub> as a solid acid catalyst. The materials were well-characterized by X-ray diffraction, N<sub>2</sub>-sorption, Scanning electron microscope, Transmission electron microscopy and NH<sub>3</sub>-TPD. Among the various catalysts, the meso-MoO<sub>2</sub> catalyst showed highest activity than the other mesoporous metal oxides due to the presence of a large amount of acidic sites. The most excellent conversion of glycerol (96%) was obtained in 1h at 20°C with 98% selectivity for the 2,2-dimethyl-1,3-dioxolane-4-methanol (solketal) using meso-MoO<sub>2</sub>. Also, the meso-MoO<sub>2</sub> catalyst was stable and reusable in most cases. These results indicate the potential of this catalyst for the acetalization of glycerol for an environmentally benign process.