

Acetalization of glycerol to solketal using sulfonated CMK-3 solid catalyst

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Highly ordered mesoporous carbon(CMK-3) materials with high surface area and chemical stability were synthesized via nano-casting method using mesoporous silica SBA-15 as a hard template. In the present work, we have synthesized sulfonated CMK-3 with different contents of sulfonic groups via sulfonation treatment with chlorosulfonic acid and the same is used as catalysts for acetalization of glycerol to solketal. The synthesized materials(CMK3-SO<sub>3</sub>H) were well-characterized by X-ray diffraction(XRD), N<sub>2</sub> adsorption-desorption, NH<sub>3</sub>-TPD, scanning electron microscope(SEM), FT-IR spectroscopy, etc. Characterization studies revealed that more number of acidic sites were present in the sulfonated ordered mesoporous carbon(CMK3-SO<sub>3</sub>H) catalysts as compared to pure CMK-3, attributed to the synergistic effect between -SO<sub>3</sub>H group and CMK-3. Acetalization of glycerol with acetone to solketal(2,3-dimethyl-1,3-dioxolane-4-methanol) were carried out at 70°C under atmospheric pressure in order to test the catalytic activities of CMK3-SO<sub>3</sub>H. Sulfonated catalyst(CMK3-SO<sub>3</sub>H) exhibits better catalytic activity and recyclability, compared to pure CMK-3, which is mainly due to the presence of more acidic sites after sulfonation treatment.