

Sulfonic acid Functionalized Mesoporous SBA-16 for the Dehydration of D-Glucose

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Mesoporous SBA-16 silica was functionalized with propylsulfonic acid group by using 3-mercaptopropyltrimethoxysilane as a sulfonic acid source after synthesizing SBA-16 followed post-synthetic grafting method. The materials before and after functionalization have been characterized by BET surface area and pore size distribution by BJH method, TEM, X-ray powder diffraction and TPD of NH₃. Sulfonic acid groups anchored onto SBA-16 silica pore surfaces are thermally stable up to 653 K, hydrothermally robust in boiling water and resistant to leaching in both organic and aqueous solvents under mild conditions. XRD results indicated that there was no change in the structure after anchoring SBA-16 with SO₃H group. SBA-16-SO₃H catalyst was found to be highly active for the dehydration of D-glucose. Dehydration of D-glucose to hydroxymethyl furfural and levulinic acid could be one of the key steps in the bioconversions. Levulinic acid is a highly versatile chemical with numerous industrial uses, having the potential to become a commodity chemical. It can be used as a raw material for resins, plasticizers, textiles, animal feed, coatings and antifreeze.