

The synthesis and catalytic application of biporous silicate materials

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Biporous silicate materials have obvious advantages such as high surface area induced from mesoporous structures and easy access to active sites derived from macroporous structures. In this regard, the materials should be very attractive for their application in the area of adsorption, catalysis and separation. The macrostructured mesoporous silicates were prepared by a new dual-templating method. Monodispersed micron-sized polystyrene (PS) beads were added without any pre-arrangement directly to a gel solution prepared for the synthesis of mesoporous MCM-41. Macropore and skeletal silicates were observed by SEM, the mesoporous structures of silicates were characterized by XRD patterns and N₂ adsorption analysis, and macropores and mesopores were observed by TEM. The materials were applied to several catalytic reaction, such as VOCs adsorption, HC-SCR (Hydro Carbon - Selective Catalytic Reduction), and HDS(Hydro Desulfurisation).