

The synthesis and application of mesoporous SBA-15 having macropores induced by colloidal crystal templating

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Mesoporous SBA-15 has obvious advantages such as good hydrothermal stability induced from thicker wall than that of MCM-41, and high surface area induced from mesoporous structures. Furthermore, in the case of coexistence of mesopores and macropores, the materials have additive advantage like ease access to active sites derived from macroporous structures. In this regard, meso/macroporous SBA-15 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 SBA-15. The morphology of macro-structure was observed by SEM, the mesoporous structures of silicates were characterized by XRD patterns and N_2 adsorption analysis, and coexistence of macropores and mesopores were observed by TEM. The materials were applied to VOCs adsorption. Meso/macroporous SBA-15 showed more adsorption capability than pure SBA-15.