

Synthesis of a Hierarchical Tri-Modal Porous Silica

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Hierarchical porous materials have received a tremendous research interest because of their potential role in overcoming mass transport limitations of single-mode porous materials in various industrial applications. This work reports the synthesis of a novel hierarchical tri-modal porous silica using 7.5 molar ratio of 1,2,4-trimethylbenzene:tri-block copolymer, $\text{EO}_{20}\text{PO}_{70}\text{EO}_{20}$. The pore size distribution curve shows the presence of three types of pores with $d_m \sim 8$, 25 and 89 nm. The existence of macropores, larger ordered mesopores, and smaller ordered mesopores. This research provides new insights to develop novel tri-modal porous silica materials with versatile applications.

Keywords: Hierarchical porous materials, tri-modal porous silicas, CO_2 reforming of CH_4 , catalysts, hydrothermal assisted sol-gel method