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高骨架铝含量**Al-MCM-41**的合成

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摘要　　制备了不同Al含量的Al-MCM-41试样，其中Si/Al比值最小为3，即最高含铝量x_{Al}=0.303。X射线粉末衍射(XRD)分析表明样品具有MCM-41的特征结构，氮气吸附研究表明，样品呈现Ⅳ型吸附等温线，具有孔径分布均一的中孔结构。文中还利用^{27}Al MAS NMR研究了试样中Al的化学环境，结果表明，即使在高铝含量的情况下，样品中的铝原子仍以四配位结合在MCM-41的硅骨架上，未能检测出骨架外六配位铝的存在。文中还就Al含量对孔结构的影响以及Al-MCM-41形成机理作了讨论。
关键词　　铝　X射线衍射分析　氮　吸附　结构　催化性能
分类号　0643

Synthesis of Al-MCM-41 with high content of framework aluminum

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Abstract　Mesoporous molecular sieves MCM-41 with incorporated structural aluminum (Al-MCM-41) of different Si/Al ratios (ranging from 3 to 100) were prepared using a modified hydrothermal method. Characterization using X-ray powder diffraction and nitrogen adsorption measurement showed that all these samples had typical XRD diffractogram of MCM-41, the adsorption isotherm of type Ⅳ and an uniform pore size distribution. The last feature reflects a highly ordered structure of pore arrays. Solid state ^{27}Al MAS NMR investigation showed further that even at high level of aluminum (x_{Al}=0.303), the Al atoms could still be incorporated tetrahedrally in the MCM-41 structure. Based on the experimental results, the effects of aluminium content on the pore structure and the formation mechanism of Al-MCM-41 were discussed.

Key words　ALUMINIUM　X-RAY DIFFRACTION ANALYSIS　NITROGEN　ADSORPTION　STRUCTURE CATALYTIC BEHAVIOUR

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