

## Cr/MCM-41催化剂的结构特征及其纳米尺寸孔内聚乙烯的形成

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**摘要** 合成了纯硅MCM-41,并以浸渍法在表面负载烯烃聚合催化活性中心---过渡金属元素Cr;通过对所得Cr/MCM-41样品的结构特征及Cr物种的存在形成进行XRD,低温N<sub>2</sub>吸附,FTIR,Raman,<sup>29</sup>SiNMR等表征发现,Cr/MCM-41具有良好的长程有序结构、较高的比表面积及均一的孔径分布。负载于MCM-41表面的Cr物种通过与羟基的相互作用分散于载体孔道内。Cr负载量较低时,Cr物种主要以孤立态存在,随着Cr含量增加,出现聚合态的Cr物种。Cr/MCM-41的一维孔道内,不仅可进行乙烯的聚合形成聚乙烯,而且反应后MCM-41的长程结构保持不变。

**关键词** [分子筛](#) [结构性能](#) [MCM-41](#) [铬](#) [催化活性](#) [聚乙烯](#) [纳米相材料](#) [乙烯聚合](#) [催化剂](#)

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## Structural characterization of Cr/MCM-41 and polymerization of ethylene within its nanoscale channels

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**Abstract** The important characteristics of MCM-41 such as large BET surface area, high porosity, large-diameter channel apertures, controllable and narrowly distributed pore sizes make this material a very promising candidate for catalyst or catalyst support. In this work, the use of MCM-41 as a support for chromium, which is phillips' active site for olefin polymerization, and the potential application of Cr-modified MCM-41 in ethylene polymerization were investigated. The Cr/MCM-41 was characterized by XRD, N<sub>2</sub> adsorption, FT-IR, Raman and NMR spectroscopy. The XRD and N<sub>2</sub> adsorption results showed that Cr/MCM-41 catalysts still possessed long-ordered structures, large surface areas and uniform pore diameters. Chromium species was well dispersed on the surface of MCM-41 until the chromium loading reached 7%. FT-IR and Raman spectra indicated that the well dispersed Cr species was present as isolated at low Cr loading, while as both isolated and polymerized at high loading. NMR spectra suggested Cr species was dispersed on the surface of MCM-41 probably by interacting with the hydroxyls. PE with a certain conformation can be formed within the nanoscale one-dimensional channels of MCM-41 without destroying the pore structure, which seemed to indicate an promising application of MCM-41 in nano-composites. The comparison between Cr/MCM-41 and Cr/SiO<sub>2</sub> has also been made.

**Key words** [MOLECULAR SIEVE](#) [STRUCTURAL BEHAVIOUR](#) [CHROMIUM](#) [CATALYTIC ACTIVITY](#) [POLYETHYLENE](#) [NANOPHASE MATERIALS](#) [CATALYST](#)

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