

介孔硅负载 Keggin 型钨磷酸催化环己烯环氧化

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摘要 采用共合成法制备了一系列不同硅氨基含量的介孔氧化硅 SBA-15, 在其孔道中引入 Keggin 型钨磷酸, 且其含量随硅氨基含量的增加而增加. 考察了不同处理温度下杂多酸的热稳定性, 发现焙烧后钨物种能在 SBA-15 孔道内高度分散. 以 H₂O₂ 为氧化剂, 研究了该催化剂在环己烯环氧化反应中的催化活性, 考察了杂多酸负载量和焙烧温度对催化活性的影响. 结果表明, 400 °C 处理后的钨磷酸催化剂具有高的反应活性和重复使用性能.

关键词: 12-磷钨酸 硅氨基化 SBA-15 环氧化 环己烯

Abstract: A series of aminosilylated mesoporous silica (SBA-15) samples with different contents of (3-aminopropyl)triethoxysilane (APTES), synthesized using a simple one-pot method, were used as hosts for immobilization of Keggin-type 12-phosphotungstic acid (H₃PW₁₂O₄₀). The loading of H₃PW₁₂O₄₀ increased with increasing content of grafted APTES. The obtained materials were calcined at different temperatures, and the tungsten species were highly dispersed inside the SBA-15 channels. The catalytic activities of these samples were tested in heterogeneous oxidation of cyclohexene using H₂O₂ as the oxidant. The effects of different loadings and treatment temperatures on the activities of the catalysts were also investigated. The catalysts calcined at 400 °C showed high catalytic activities and reusabilities.

Keywords: 12-phosphotungstic acid, aminosilylation, SBA-15, epoxidation, cyclohexene

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