

研究论文

微波合成TS-1分子筛的催化性能研究

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摘要 采用微波加热技术法合成TS-1分子筛,以30%的H₂O₂水溶液为氧化剂,考察了所合成的TS-1分子筛在苯乙烯和1-己烯环氧化反应中的催化性能,并与传统水热法合成的TS-1进行了比较.结果表明,由微波合成TS-1的催化性能比传统水热法合成的TS-1更为优异.采用XRD, FT-IR, UV-vis, SEM等手段对二者进行表征,发现微波合成的TS-1晶粒与晶粒之间存在“粘连”现象,这种现象降低了分子筛表面硅羟基含量,增加了TS-1分子筛的疏水性,使得分子筛对反应底物苯乙烯和1-己烯的吸附能力增强,从而导致催化性能显著提高.

关键词 [微波辐射](#) [TS-1](#) [苯乙烯](#) [1-己烯](#) [环氧化](#) [疏水性](#)

分类号

Study on the Catalytic Properties of TS-1 Molecular Sieves Synthesized under Microwave Irradiation

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Abstract Titanium silicate-1 (TS-1) was synthesized under microwave irradiation. Their catalytic property was investigated by the epoxidations of styrene and 1-hexene with 30% H₂O₂ as oxidant, which is better than that of TS-1 synthesized by conventional hydrothermal methods. Characterization of two kinds of TS-1 were carried out by technologies such as XRD, IR, UV-vis and SEM, etc. The crystal particles of TS-1 molecular sieve from microwave irradiation (TS1-MI) were found to exhibit an adhered columnar morphology and less silanol groups than those from the conventional method (TS1-CM). The better catalytic properties of TS1-MI were deduced to be due to its higher hydrophobicity, which comes from the consumption of surface silanol groups between TS-1 particles. The higher hydrophobicity of TS1-MI can increase the adsorption capacity leading to a higher catalytic activity.

Key words [microwave irradiation](#) [TS-1 molecular sieves](#) [styrene](#) [1-hexene](#) [epoxidation](#) [hydrophobicity](#)

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