

新型固体酸催化剂Nafion/SiO₂的制备与表征

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摘要 以正硅酸乙酯为硅源,通过原位溶胶-凝胶技术,制得一类由中孔孔道氧化硅组装的纳米Nafion固体酸催化剂Nafion/SiO₂,大大增加了Nafion^(R)NR50酸性中心的暴露量,提高了活性中心的可接近程度。BET,FTIR,TG,SEM和EDX分析表明,NR50的纳米颗粒负载在多孔性SiO₂中呈现分布均匀;NH₃-TPD分析结果表明,固体酸催化剂Nafion/SiO₂具有四种强度不同的酸性位,且其主要酸性中心(SO₃H)具有两种不同的热稳定性。

关键词 [催化剂](#) [氧化硅](#) [溶胶-凝胶法](#) [全氟磺酸树脂](#) [固体酸](#) [热稳定性](#)

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Preparation and characterization of a novel class of solid acid catalyst nafion/SiO₂

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Abstract Due to its superacidic character, high thermal stability and chemical resistance, Nafion^(R)NR50 is a very promising catalyst for a wide range of acid-catalyzed reactions. However, its application is often limited by its extremely low specific surface area. A new class of solid acid catalysts Nafion/SiO₂ with meso-pore structure has been developed using an in situ sol-gel technique, where solutions of Nafion resin were mixed with soluble silicon sources of tetraethylorthosilicate to form a gel. The gel was then dried to give a clear hard glass-like material. These new porous materials showed significantly enhanced activity due to increased accessibility of the Nafion resin-based acid sites. BET, FTIR, TG, SEM and EDX indicated that Nafion resin nanoparticles were completely trapped and highly dispersed within a porous silica network. NH₃-TPD disclosed that the materials have four groups of acidic sites and that the thermal stability of SO₃H groups was different.

Key words [CATALYST](#) [SILICON OXIDE](#) [SOL-GEL PROCESS](#) [SOLID ACID](#) [THERMAL STABILITY](#)

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