

# 介孔 MCM-41 接枝双季胺化离子液体高效催化环氧化合物与 CO<sub>2</sub> 环化反应合成环状碳酸酯

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CO<sub>2</sub>作为碳氧资源的转化利用对于经济社会的可持续发展具有重要意义。环状碳酸酯在有机合成、溶剂、纺织、印染等领域具有广泛用途。CO<sub>2</sub>与环氧化合物合成环状碳酸酯是典型的原子经济性反应<sup>[1]</sup>, 现已报道的催化体系不同程度存在一些问题, 如催化剂成本高、活性不高、催化剂不易分离、易流失等问题。我们合成了一系列不同类型硅胶接枝的双季铵盐离子液体, 路线如图1所示。其中MCM-41接枝的TMEDA<sup>+</sup>T在环氧丙烷与CO<sub>2</sub>的反应中表现出较优的催化性能, TOF可达>60h<sup>-1</sup>。催化剂重复使用多次而活性没有明显下降, 且对于合成其它环状碳酸酯也表现出很好的催化活性。

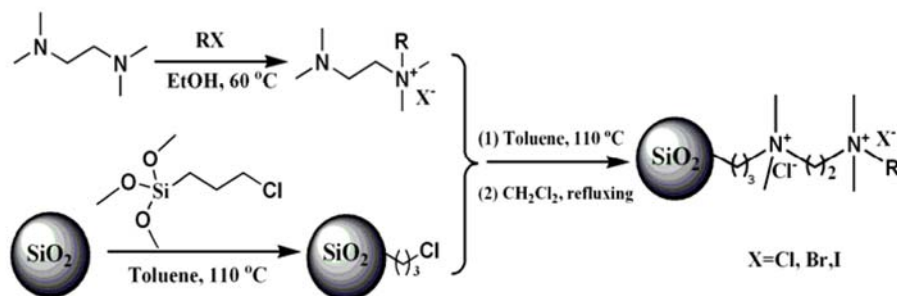


Fig. 1 Preparation route of SiO<sub>2</sub> grafted bis(quaternary ammonium) ionic liquids

关键词: 二氧化碳; 环氧化合物; 环状碳酸酯; 绿色合成

参考文献

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## Bis(quaternary ammonium) ionic liquids grafted onto Mesoporous MCM-41 as efficient catalyst for cycloaddition of CO<sub>2</sub> to epoxides

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A series of bis(quaternary ammonium) ionic liquids were prepared via grafting onto different types of silica gel. Among them, TMEDA<sup>+</sup>T grafted onto MCM-41 demonstrated superior catalytic activity in the cycloaddition of CO<sub>2</sub> to propylene oxide. The catalytic activity was greatly enhanced compared to that of the analogous mono(quaternary ammonium) ionic liquid catalyst with amine functional group. The catalyst can be reused for several times without significant loss in activity. This catalyst was also effective for the syntheses of other terminal carbonates. This preparation method was expected to provide an effective strategy to synthesize immobilized quaternary ionic liquid with tunable counter-anions.