

材料化学工程与纳米技术

一种新的离子液体在一氧化碳和苯乙烯共聚反应中的应用

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摘要

以4-甲基吡啶、溴代正丁烷、六氟磷酸钾为原料利用微波合成了1-丁基-4-甲基吡啶六氟磷酸盐离子液体, 并以其为反应介质采用复配催化体系 $[\text{Pd}(\text{N-N})_2][\text{BF}_4]_2$ 、 $[\text{Pd}(\text{N-N})_2][\text{PF}_6]_2$ 催化一氧化碳和苯乙烯共聚, 合成了聚酮 (STCO)。利用元素分析、热重分析、GPC、核磁共振及红外光谱等方法对离子液体和共聚产物进行表征。用离子液体代替传统溶剂, 考察了不同的钯催化剂、离子液体用量、反应时间对聚合反应的影响及钯复配催化剂在离子液体中对一氧化碳和苯乙烯交替共聚的重复使用性。实验结果表明, $[\text{Pd}(\text{N-N})_2][\text{PF}_6]_2$ 复配催化剂在离子液体中的催化活性最高; 使用离子液体有效地增加了聚酮产量, 提高了催化活性; 催化体系重复使用4次后, 催化活性仍保留第一次的51%。

关键词

[聚酮](#) [钯复配催化剂](#) [离子液体](#) [苯乙烯](#) [一氧化碳](#)

分类号

Application of novel ionic liquid in copolymerization of carbon monoxide and styrene

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Abstract

Room temperature ionic liquid 1-butyl-3-methylpyridinium hexafluorophosphate as solvent for palladium-catalyzed copolymerization of carbon monoxide and styrene was prepared by the reaction of 4-methyl pyridine, bromobutane and potassium hexafluorophosphate under microwave irradiation. Ionic liquid and copolymer were characterized by elemental analysis, thermogravimetry (TG), GPC, ^1H NMR spectroscopy and Fourier transform infrared spectroscopy (IR). The different palladium catalysts, amount of ionic liquid, reaction time and the reusability of the catalyst-ionic liquid system were discussed. It was found that the yield of polyketone and the catalytic activity of catalyst-ionic liquid system were enhanced over conventional solvent under similar conditions and it was also found that the composite catalyst-ionic liquid system still kept 51% of the initial catalytic activity after 4 successive cycles.

Key words

[polyketone](#) [palladium composite catalyst](#) [ionic liquid](#) [styrene](#) [carbon monoxide](#)

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