

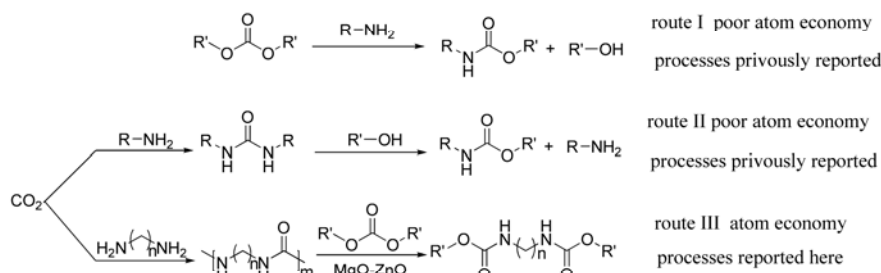
MgO-ZnO 复合氧化物催化聚脲与碳酸二烷基酯原子经济反应合成 N-取代的氨基甲酸酯

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CO₂的资源化利用引起了广泛的关注, 将其作为碳氧资源转化成能源、材料和化工产品等是当今各国政府及科学界的重大战略课题。目前, CO₂的大规模利用主要集中在替代光气合成脲类化合物和碳酸酯^[1]。N-取代氨基甲酸酯在有机合成、医药、农药等领域具有广泛用途, 特别是非光气合成异氰酸酯的重要原料。脲类化合物与碳酸二烷基酯合成N-取代氨基甲酸酯是典型的原子经济性反应, 有必要开发一种成本较低、活性较高的多相催化剂体系。这里, 在无催化剂的情况下, 我们利用脂肪二胺与CO₂成功合成了聚脲化合物。然后, 在MgO-ZnO复合氧化物催化剂作用下, 聚脲与碳酸二烷基酯反应, 高效的合成了N-取代的二氨基甲酸酯, Scheme 1。催化剂可以重复使用多次而活性基本不变, 而且对合成不同的N-取代氨基甲酸酯也表现出很好的催化活性。



Scheme 1 The transformations between urea, carbonate and carbamates derived from amine and CO₂

关键词: 二氧化碳; 聚脲; 碳酸二烷基酯; 氨基甲酸酯; 原子经济

参考文献

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Atom economy synthesis of N-substituted carbamate from dialkyl carbonate and polyurea with CO₂ over MgO-ZnO catalyst

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An effective route for the atom economy synthesis of N-substituted carbamate from dialkyl carbonate and polyurea based on diamine and CO₂ was presented. The polyurea derivatives could be effective synthesis from aliphatic diamine and CO₂ in the absence of any catalyst. Several metal oxide catalysts were tested for the synthesis of N-substituted dicarbamates from dialkyl carbonate and polyurea derivatives. The MgO-ZnO catalyst showed a good performance for this reaction and could be reused for five times without obvious deactivation.