

研究论文

## 离子液体中芳烃侧链分子氧催化氧化反应研究

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**摘要** 分别以离子液体[Hex-mim]BF<sub>4</sub>, [Bmim]BF<sub>4</sub>, [Bmim]PF<sub>6</sub>和[Omim]BF<sub>4</sub>为溶剂, Co(II), Mn(II)或Ni(II)/NHPI(AIBN)为复合催化剂, 考察了不同离子液体-催化剂体系中常压分子氧氧化芳烃侧链烷基的反应. 在[Hex-mim]BF<sub>4</sub>中, Co(II)或Mn(II)/NHPI可有效地催化芳烃侧链烷基的分子氧化. 在优化条件下, 乙苯、正丙苯和正丁苯分别以高达90%, 94%和93%的收率得到相应的芳香酮; 甲苯和对位取代甲苯以32%~47%的收率被氧化为相应的芳香酸. 离子液体及金属催化剂体系在减压下除水后, 可循环使用.

**关键词** [离子液体](#) [催化氧化](#) [分子氧](#) [烷基苯](#)

**分类号** [O625.4](#) [TQ243.1](#)

## Catalytic Oxidation of Alkylbenzenes with Molecular Oxygen in Ionic Liquids

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**Abstract** Using ionic liquid [Hex-mim]BF<sub>4</sub>, [Bmim]BF<sub>4</sub>, [Bmim]PF<sub>6</sub>, and [Omim]BF<sub>4</sub> as the solvent, respectively, the oxidation of alkylbenzenes by molecular oxygen was investigated under atmospheric pressure with Co(II), Mn(II), or Ni(II)/NHPI (or AIBN) as the catalysts. The [Hex-mim]BF<sub>4</sub>/Co<sup>2+</sup> (or Mn<sup>2+</sup>)/NHPI system was demonstrated efficient for the oxidation of alkylbenzene. Under the optimized condition, ethylbenzene, n-propylbenzene, and n-butylbenzene were oxidized to the corresponding aromatic ketone with yields up to 90%, 94%, and 93%, respectively, toluene and p-substituted toluene were oxidized to benzoic acid and the corresponding p-substituted benzoic acid with yields of 32%—47%. The ionic liquid and metal catalyst could be reused by removing water from them under a reduced pressure.

**Key words** [Ionic liquid](#) [Catalytic oxidation](#) [Molecular oxygen](#) [Alkylbenzene](#)

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