

N-羟基邻苯二甲酰亚胺与 8-羟基喹啉氧钒 (IV) 配合物协同催化分子氧氧化乙苯

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摘要 研究了钒化合物对 N-羟基邻苯二甲酰亚胺 (NHPI) 催化分子氧氧化乙苯反应中的调变效应。结果表明, 由 8-羟基喹啉及其衍生物与乙酰丙酮氧钒 (IV) 配位制得的 8-羟基喹啉氧钒 (IV) 配合物的催化活性比乙酰丙酮氧钒 (IV), NH₄VO₃ 和 V₂O₅ 的高。在优化的反应条件下, 乙苯转化率和苯乙酮选择性可分别达 60%~69% 和 97%。基于液体反应的紫外光谱, 推测钒催化剂能够促进 NHPI 转变为 N-氧基邻苯二甲酰亚胺自由基和 1-苯基过氧化氢转变为苯乙酮。

关键词: N-羟基邻苯二甲酰亚胺 8-羟基喹啉氧钒 (IV) 需氧化 乙苯 苯乙酮

Abstract: The mediation effect of vanadium compounds on the N-hydroxyphthalimide (NHPI)-catalyzed aerobic oxidation of ethylbenzene (EB) was investigated at 90 ° C in benzonitrile. Among the vanadium mediators examined, a series of oxobis(8-quinolinolato) vanadium (IV) complexes (V^{IV}OQ₂), which were prepared by the coordination of 8-hydroxyquinoline or its derivatives with oxobis(2,4-pentanedionate) vanadium (IV) (V^{IV}O(acac)₂) showed a better mediation effect than V^{IV}O(acac)₂, NH₄VO₃, and V₂O₅ and they gave about 60% - 69% EB conversion and 97% of acetophenone (AcPO) selectivity under optimum reaction conditions. This is due to the dual catalysis effects of these V mediators on the transformation of NHPI to the phthalimide-N-oxyl (PINO) radical and the decomposition of 1-phenylethyl hydroperoxide to AcPO, as supported by UV-Vis spectral characterization.

Keywords: n-hydroxyphthalimide, oxobis(8-quinolinolato) vanadium (IV), aerobic oxidation, ethylbenzene, acetophenone

收稿日期: 2011-02-28; 出版日期: 2011-07-22


引用本文:

秦金伟, 伏再辉, 刘亚纯等 .N-羟基邻苯二甲酰亚胺与 8-羟基喹啉氧钒 (IV) 配合物协同催化分子氧氧化乙苯[J] 催化学报, 2011,V32(8): 1342-1348


QIN Jin-Wei, FU Zai-Hui, LIU Ya-Chun etc .Aerobic Oxidation of Ethylbenzene Co-catalyzed by N-Hydroxyphthalimide and Oxobis(8-Quinolinolato) Vanadium (IV) Complexes[J] Chinese Journal of Catalysis, 2011,V32(8): 1342-1348


链接本文:

http://www.chxb.cn/CN/10.1016/S1872-2067(10)60255-0 或 http://www.chxb.cn/CN/Y2011/V32/I8/1342

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