

常压下 Pt-Bi 双金属催化剂上甘油选择性氧化

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摘要 制备了一系列活性炭 (AC) 负载的 Pt-Bi 双金属催化剂, 考察了催化剂中 Bi 含量对其催化甘油选择性氧化反应性能的影响. 结果表明, 适量 Bi 的添加可以改善催化剂中 Pt 的氧化还原性能, 从而有利于催化剂活性的提高和二羟基丙酮 (DIHA) 产物的生成. 当 Bi 的含量为 5% 时, 该催化剂的活性最高, 甘油转化率和 DIHA 选择性分别达到 91.5% 和 49.0%. 表征结果显示, Pt-Bi 颗粒的平均粒径为 3.8 nm, 且高度分散在催化剂表面, 这是该催化剂具有较高活性的主要原因.

关键词: 甘油氧化 铂 铋 活性炭载体 二羟基丙酮

Abstract: A series of bimetallic Pt-Bi catalysts with a constant platinum content of 5.0 wt% and a varied bismuth content (3.0 – 7.0 wt%) supported on active carbon were prepared and used for glycerol oxidation with oxygen under atmospheric pressure. The bimetallic Pt-Bi/C was efficient for the selective oxidation of glycerol to dihydroxyacetone (DIHA) and the selectivity for DIHA reached 49.0% at a 91.5% conversion of glycerol over the 5%Pt-5%Bi/C catalyst. X-ray diffraction and transmission electron microscopy analysis revealed that the specially configured Pt-Bi nanoparticles in 5%Pt-5%Bi/C were highly dispersed (3.8 nm) over the active carbon support, which is proposed to contribute to the improved performance.

Keywords: glycerol oxidation, platinum, bismuth, carbon support, dihydroxyacetone

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