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柴油尾气DOC催化剂Pt-Pd/CeO_2的活性和抗硫性

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Activity and sulfur resistance of Pt-Pd/CeO_2 catalysts for the oxidation of diesel exhaust

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摘要 采用浸渍法制备了不同Pt、Pd比例的Pt-Pd/CeO_2催化剂,考察了其催化氧化模拟柴油车尾气的活性,并测试了抗硫性。活性测试结果表明,Pt、Pd协同降低了催化剂的起燃温度,其比例对催化剂性能影响很大,其中,$Pt_{0.2}Pd_{0.8}/CeO_2$催化剂在模拟柴油车尾气(丙烯(C_3H_6)、一氧化碳(CO)和一氧化氮(NO))中的催化活性最高;C_3H_6的t_{50}降到170℃,CO的t_{50}降到了150℃,显示了良好的Pt、Pd协同效应;H_2-TPR表征和抗硫性结果分析表明,高比例Pt/Pd催化剂具有更多的表面活性氧,其相对数值与催化剂抗硫性能的关联度高,在催化剂硫酸盐中毒的条件下,更有利于催化反应的进行。

关键词: DOC催化剂　Pt-Pd协同　柴油尾气　抗硫性

Abstract: A series of Pt-Pd/CeO_2 catalysts with different Pt/Pd ratios were synthesized by impregnation method; their catalytic activity and sulfur resistance in the oxidation of diesel exhaust were investigated. The results showed that Pt-Pd synergy is able to reduce the ignition temperature and broaden the active window of Pt-Pd/CeO_2 catalysts for the oxidation of diesel exhaust. The ratio of Pt/Pd has a great effect on catalytic performance; The $Pt_{0.2}Pd_{0.8}/CeO_2$ catalyst shows the highest activity in the oxidation of simulated diesel exhaust containing C_3H_6, CO and NO. H_2-TPR results suggest that the amount of surface active oxygen increases with the Pt/Pd ratio, which is also well related to the sulfur resistance of the Pt-Pd/CeO_2 catalysts; higher Pt/Pd ratio is of benefit to the oxidation of diesel exhaust in the presence of SO_2, as the active sites of PtO_2 and PdO are easily covered by sulfate.

Key words: DOC catalyst　Pt-Pd cooperative　diesel exhaust　sulfur resistance

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