

研究论文

低贵金属Pt-Rh型三效催化剂空燃比性能的研究

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**摘要** 研究了以浸渍法制备的低贵金属Pt-Rh型三效催化剂对C<sub>3</sub>H<sub>8</sub>, CO, NO的催化活性. 主要考察了CeO<sub>2</sub>-ZrO<sub>2</sub>和BaO的添加对催化剂空燃比性能的影响, 通过氧化反应、水气变换和蒸汽重整的性能研究,

探讨了催化剂三效工作窗口扩大的原因. 结果表明, 催化剂中只添加CeO<sub>2</sub>-ZrO<sub>2</sub>时即具有优异的水气变换性能,

蒸汽重整在250 °C左右发生, 并且在450 °C以下时C<sub>3</sub>H<sub>8</sub>的转化率一直保持在20%左右; BaO添加到含有CeO<sub>2</sub>-ZrO<sub>2</sub>

的催化剂中对水气变换和蒸汽重整则有明显的促进作用, 能进一步扩大催化剂的三效工作窗口;

催化剂中只添加CeO<sub>2</sub>-ZrO<sub>2</sub>时, 能明显提高催化剂对CO的氧化反应活性, 但对C<sub>3</sub>H<sub>8</sub>的氧化反应的影响则不明显;

BaO和CeO<sub>2</sub>-ZrO<sub>2</sub>同时存在于催化剂中时, 能进一步提高CO的氧化反应活性, 对C<sub>3</sub>H<sub>8</sub>

的氧化反应则没有明显的促进作用.

**关键词** [Pt-Rh](#) [三效催化剂](#) [水气变换](#) [蒸汽重整](#)

分类号

**Study of Air/Fuel Ratio Performance of Low-Precious Metal Pt-Rh Three-Way Catalysts**

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**Abstract** The catalytic activities on C<sub>3</sub>H<sub>8</sub>, CO and NO of low-precious metal of Pt-Rh three-way catalysts prepared by impregnation were studied. The influence of adding CeO<sub>2</sub>-ZrO<sub>2</sub> and BaO into catalysts on air-to-fuel ratio (A/F) was mainly investigated. The reason that A/F was broadened was studied by oxidization reaction, water-gas shift and steam reforming over catalysts. The results indicated that the catalyst merely containing CeO<sub>2</sub>-ZrO<sub>2</sub> had excellent ability of water-gas shift, and steam reforming of C<sub>3</sub>H<sub>8</sub> began to occur at 250 °C and maintained 20% of the conversion of C<sub>3</sub>H<sub>8</sub> before 450 °C. BaO was added to the catalyst containing CeO<sub>2</sub>-ZrO<sub>2</sub>, which could significantly promote water-gas shift and steam reforming and further broadened the three-way working-window of the catalyst. Only addition of CeO<sub>2</sub>-ZrO<sub>2</sub> to the catalysts could promote oxidation reaction activity of CO, but the influence on oxidation of C<sub>3</sub>H<sub>8</sub> was not obvious. Catalyst containing BaO and CeO<sub>2</sub>-ZrO<sub>2</sub> could further promote oxidation reaction activity of CO but did not obviously promote oxidation of C<sub>3</sub>H<sub>8</sub>.

**Key words** [Pt-Rh](#) [three-way catalyst](#) [water-gas shift](#) [steam reforming](#)

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