

论文

添加剂对选择性非催化还原脱硝及NH3氧化影响的实验研究

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摘要:

为了认识添加剂CO、H2和CH4对选择性非催化还原(selective non-catalytic reduction, SNCR)脱硝反应以及NH3氧化反应的影响以及添加剂存在的条件下NH3和NO的相互作用,在电加热管式反应炉上进行了实验研究。实验结果表明,无添加剂时SNCR工艺中NH3还原NO的最佳反应温度为925℃,加入CO使最佳温度降低约50℃,加入CH4或者H2使最佳温度降低约100℃。在较低的温度下NH3氧化不生成NO,当反应温度升高,NH3接近被完全消耗时,开始有NO生成。3种添加剂都使NH3发生氧化反应的最低温度降低,并使生成NO的最低温度相应的降低。除了加入H2的工况外,NO能够显著地提高NH3的氧化消耗速率。

关键词: 选择性非催化还原 NH3氧化 添加剂 NOx

Experimental Study of the Influences of Additives on Selective Non-catalytic Reduction Process and Ammonia Oxidation

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Abstract:

An experimental study of selective non-catalytic reduction (SNCR) process and the oxidation of NH3 with different additives was performed in an electricity-heated tubular flow reactor. The influences of CO, H2 and CH4 additives on SNCR process and the oxidation of NH3, as well as the interaction between NH3 and NO under the condition of coexistence with the additives were investigated. The results indicate the optimal reaction temperature for NO reduction in SNCR process is 925℃. While CO is added the optimal temperature decrease 50℃ roughly, while CH4 or H2 is added the optimal temperature could decrease 100℃ roughly. The oxidation of NH3 does not produce NO under low temperature. As the temperature rises, once NH3 is consumed almost completely, NO is produced from the oxidation of NH3. All the three additives could decrease the minimum temperature under which NH3 could be oxidized and the minimum temperature under which NO is produced due to the oxidation of NH3. NO could enhance the oxidation rate significantly except the test conditions with H2 addition.

Keywords: selective non-catalytic reduction NH3 oxidation additive NOx

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