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论文

金属铁直接催化还原NO的实验研究

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摘要：

在水平陶瓷管反应器中对铁丝网卷直接催化还原NO的特性进行实验研究，于-300～-1 100 ℃对还原性气体CO、氧化性气体O2，CO2以及模拟烟气等气氛条件下的NO脱除效率进行测试，并对铁丝反应后表面组分变化特点进行X光衍射（XRD）分析。结果表明，金属铁具有非常高效的直接催化还原NO的作用。在温度高于700 ℃、N2气氛中，铁直接催化还原NO的效率超过90%。CO有利于铁的氧化物还原为金属铁，进一步提高了铁直接催化还原NO的效率；而O2能将金属铁氧化为Fe2O3，降低了铁直接催化还原NO的效率；CO2气体的影响相对较小。当温度达到950 ℃后，在模拟烟气（含16.8% CO2，2% O2）条件下，铁丝网和4.01%的CO即可达到90%以上的NO脱除效率。

关键词： 铁丝网卷；催化还原；氮氧化物

Experimental study on direct catalytic reduction of NO by metallic iron

Abstract:

Catalytic reduction of NO by metallic iron mesh roll was experimentally studied in a horizontal ceramic tubular reactor.The NO reduction efficiency was tested in the temperature range of 300-1 100 ℃ in the atmospheres of CO，O 2，CO 2 and simulated flue gas respectively.The results show that metallic iron is very effective to catalytically reduce NO to N 2.More than 90% of NO is reduced by the iron mesh roll when the temperature is higher than 700 ℃ in N 2 atmosphere.CO gas is able to reduce iron oxides formed during the reaction of Fe and NO to metallic iron and the NO reduction efficiency is further improved when CO is fed into the reactor.However，O 2 strongly oxidizes Fe to its oxides and the NO reduction efficiency is remarkably decreased when there is O 2 in the flue gas.CO 2 has a small influence on NO reduction result.90% NO reduction efficiency is measured when the temperature is higher than 950C in simulated flue gas conditions consisting of 16.8%CO 2，2% O 2 when iron mesh roll is used with 4.01% CO.

Keywords: iron mesh roll；catalysis reduction；nitric oxide

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