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研究快讯

Mn掺杂对Ni/ZnO吸附剂脱硫性能的改进

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- 摘要
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摘要 合成了5%Ni/Mn-ZnO吸附剂体系, 并在固定床上考察了Mn的掺杂对该吸附剂的吸附脱硫性能的影响. 8%MnO掺杂的5% Ni/MnO-ZnO吸附剂抗烧结性能显著提高, 并且吸附剂的脱硫活性和再生活性均有较大提高, 三次再生后的脱硫率仍比一次再生的无Mn掺杂的5%Ni/ZnO吸附剂的脱硫率高出约4%. XRD表征显示掺杂后的吸附剂有ZnMnO3生成.

关键词: 吸附脱硫 镍 锰 氧化锌 吸附剂 再生

Abstract: The effect of Mn doping on the adsorptive desulfurization performance of 5%Ni/ZnO adsorbents was investigated in model gasoline, with thiophene as a sulfur-containing compound, using a fixed-bed reactor. The 5%Ni/MnO-ZnO adsorbents with different levels of Mn doping were prepared using an incipient wetness impregnation method and characterized by powder X-ray diffraction (XRD). It was found that the adsorption performances of the 5%Ni/MnO-ZnO adsorbents were considerably improved after Mn doping compared with that of 5%Ni/ZnO. Moreover, the 5%NiO/MnO-ZnO adsorbents showed high desulfurization activities after regeneration. Sulfur removal by a 5%NiO/8%MnO-ZnO adsorbent after three reaction-regeneration cycles was 4% higher than that by a 5%NiO/ZnO adsorbent without Mn doping. The excellent performance of the 5%NiO/8%MnO-ZnO adsorbent in desulfurization, and its regenerability, were attributed to formation of a new compound, $ZnMnO_3$, in the adsorbent; this compound was characterized using XRD.

Keywords: Adsorptive desulfurization, Nickel, Manganese, Zinc oxide, Adsorbent, Regeneration

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