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Al_2O_3孔结构对纳米HZSM-5基催化剂改质FCC汽油性能的影响

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Effects of Al_2O_3 pore structure on FCC gasoline upgrading properties of the nanosized HZSM-5 based catalysts

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摘要 采用NH_3-TPD、FT-IR、N_2吸附-脱附等手段对两种不同来源的氧化铝样品进行了表征。结果表明,两种Al_2O_3的总酸量及酸强度没有明显差别,酸类型均以Lewis酸为主,其中,Al_2O_3 (b)的平均孔径及孔体积较大。在固定床微型反应装置上考察了以两种Al_2O_3为载体制备的纳米HZSM-5基催化剂改质全馏分FCC汽油的性能。实验结果表明,以大孔Al_2O_3为载体的HZSM-5基催化剂具有较好的降烯烃、芳构化、异构化活性及稳定性。改性纳米HZSM-5负载的LaNiMo催化剂对FCC汽油的300 h评价结果表明,烯烃饱和率为83%,脱硫率为87%,同时维持了油品的辛烷值。

关键词: Al_2O_3载体 纳米HZSM-5 催化裂化汽油 辛烷值

Abstract: Two Al_2O_3 supports were characterized by means of NH_3-TPD, FT-IR and N_2 adsorption-desorption. The characterization results showed that the two Al_2O_3 supports have no significant differences in their total acidity and acidity strength. The acid sites are mainly Lewis ones, but Al_2O_3 (b) has larger average pore diameter and pore volume than Al_2O_3 (a). The influence of the pore structures of the Al_2O_3 supports on the full range FCC gasoline upgrading performance of the nanosized HZSM-5 based catalysts was investigated in a fixed-bed reactor. The results indicated that the HZSM-5 catalyst extruded with macroporous Al_2O_3 exhibited superior activity, stability and performance in reducing olefin content of FCC gasoline. The modified nanosized LaNiMo/HZSM-5 catalyst reduced olefin and sulfur concentration in FCC gasoline by about 83% and 87% within 300 h time on stream, respectively, meanwhile the gasoline octane number was preserved.

Key words: alumina support nanosized HZSM-5 FCC gasoline octane number

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