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THERMODYNAMICS AND CHEMICAL……

正丁烷及丁烯-1在不同硅铝比ZSM-5分子筛上吸附的实验与模型

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摘要 Four ZSM-5 zeolite catalysts with different Si/Al ratios for the catalytic cracking of C4 fractions to produce ethylene and propylene were prepared in this study. First, the adsorption isotherms of pure n-butane and butene-1 and their mixtures on these catalysts at 300K and p＝0—100kPa were measured using the intelligent gravimetric analyzer. The experimental results indicate that the presence of Al can significantly affect the adsorption of butene-1 than that of n-butane on ZSM-5 zeolites. Then, the double Langmuir (DL) model was applied to study the pure gas adsorption on ZSM-5 zeolites for pure n-butane and butene-1. By combining the DL model with the ideal adsorbed solution theory (IAST), the IAST-DL model was applied to model the butene-1 (1)/n-butane (2) binary mixture adsorption on ZSM-5 zeolites with different Si/Al ratios. The calculated results are in good agreement with the experimental data, indicating that the IAST-DL model is effective for the present systems. Finally, the adsorption over a wide range of variables was predicted at low pressure and 300K by the model proposed. It is found that the selectivity of butene-1 over n-butane increases linearly with the decrease of Si/Al ratio. A correlation between the selectivity and Si/Al ratio of the sample was proposed at 300K and p=0.08MPa.

关键词 ZSM-5 zeolite n-butane butene-1 adsorption isotherm Si/Al ratio selectivity
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本刊中 包含“ZSM-5 zeolite”的相关文章
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Experiment and modeling of pure and binary adsorption of n-butane and butene-1 on ZSM-5 zeolites with different Si/Al ratios

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Key words ZSM-5 zeolite; n-butane; butene-1; adsorption isotherm; Si/Al ratio; selectivity

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