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RESEARCH NOTES

苯-水混合蒸气在活性炭上的二元吸附平衡

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摘要 Adsorption equilibrium isotherms of benzene in the concentration range of 500-4000mg@m-3 on two commercial activated carbons were obtained using long-column method under 30℃ and different humidity conditions. Results show that the benzene and water vapors have depression effects upon the adsorption of each other and that the unfavorable effect of water vapor resembles its single-component isotherm on activated carbon. A competitive adsorption model was proposed to explore the depression mechanisms of the non-ideal, non-similar binary adsorption systems. A modified Polanyi-Dubinin equation was set up to correlate the binary adsorption equilibrium and to calculate the isotherms of benzene on activated carbon in presence of water vapor with considerable precision.

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Binary Adsorption Equilibrium of Benzene-Water Vapor Mixtures on Activated Carbon

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Abstract Adsorption equilibrium isotherms of benzene in the concentration range of 500-4000mg@m-3 on two commercial activated carbons were obtained using long-column method under 30℃ and different humidity conditions. Results show that the benzene and water vapors have depression effects upon the adsorption of each other and that the unfavorable effect of water vapor resembles its single-component isotherm on activated carbon. A competitive adsorption model was proposed to explore the depression mechanisms of the non-ideal, non-similar binary adsorption systems. A modified Polanyi-Dubinin equation was set up to correlate the binary adsorption equilibrium and to calculate the isotherms of benzene on activated carbon in presence of water vapor with considerable precision.

Key words activated carbon; volatile organic vapors; adsorption isotherm; humidity; equilibrium; potential theory

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