

Institute of Chemical Engineering

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Data concerning adsorption equilibria of carbon dioxide, nitrogen and oxygen over a zeolite molecular sieve 13X for the modelling of carbon dioxide capture from gaseous mixtures by adsorptive processes

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Experimental adsorption isotherms of carbon dioxide, nitrogen and oxygen at 293, 313 and 333 K over a zeolite molecular sieve 13X Grace are presented. The data were used in the simulations of the hybrid VSA-membrane process for carbon dioxide capture from flue gas as presented in a related article entitled “The performance of a hybrid VSA-membrane process for the capture of CO₂ from flue gas”[1]. A representative sample of ZSM 13X Grace (149.7 mg) was prepared using the Microscal Spinning Riffler. Adsorption equilibria were determined by a gravimetric method, which uses a microbalance IGA003, Hiden Isochema Ltd., UK at temperatures of 293, 313 and 333 K. Every adsorption isotherm was started at 0 bar. For CO₂ the equilibrium concentration reaches 3.755- 4.857 mol kg⁻¹ at the maximum pressure of 1 bar. In the case of N₂ and O₂ the equilibrium concentration reaches, respectively, 0.721-1.255 mol kg⁻¹ and 0.299-0.531 mol kg⁻¹ at the maximum pressure of 5 bar. Data may be reused in any adsorptive CO₂/N₂/O₂ separation process which uses ZMS 13X as an adsorbent.

Metryczka

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