

RESEARCH PAPERS

气体在临界温度附近吸附行为的实验研究

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**摘要** Adsorption equilibria of CH<sub>4</sub> and N<sub>2</sub> on activated carbon and silica gel were measured for a wide temperature range covering the critical point: 158-298 K for CH<sub>4</sub>, and 103-298 K for N<sub>2</sub>. The determination of the compressibility factor is shown to have considerable effect on isotherm behavior at conditions after the isotherm maximum. A change in adsorption mechanisms on crossing the critical temperature was observed in all cases. The kind of adsorbents and how far the equilibrium temperature to the critical one are major factors affecting the transition of isotherms from sub- to supercritical. All continuous isotherms can be modeled by a unique model for the supercritical region. The satisfactory fitting of the model to the experimental isotherms proved the reliability of the absolute adsorption determined by the proposed method.

**关键词** [adsorption](#) [supercritical](#) [methane](#) [nitrogen](#)

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### An Experimental Study on the Adsorption Behavior of Gases Crossing the Critical Temperature

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**Abstract** Adsorption equilibria of CH<sub>4</sub> and N<sub>2</sub> on activated carbon and silica gel were measured for a wide temperature range covering the critical point: 158-298 K for CH<sub>4</sub>, and 103-298 K for N<sub>2</sub>. The determination of the compressibility factor is shown to have considerable effect on isotherm behavior at conditions after the isotherm maximum. A change in adsorption mechanisms on crossing the critical temperature was observed in all cases. The kind of adsorbents and how far the equilibrium temperature to the critical one are major factors affecting the transition of isotherms from sub- to supercritical. All continuous isotherms can be modeled by a unique model for the supercritical region. The satisfactory fitting of the model to the experimental isotherms proved the reliability of the absolute adsorption determined by the proposed method.

**Key words** [adsorption](#); [supercritical](#); [methane](#); [nitrogen](#)

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