

论文

氢同位素吸附容量与吸附剂比表面积的关系

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摘要:

采用容积法测量了77 K下氢气与氘气在不同微孔与介孔分子筛吸附剂上的吸附容量与比表面积. 结果表明, 同类吸附剂上氢同位素的吸附容量与其比表面积之间存在较好的线性关系, 这有力地证明了超临界温度下氢同位素吸附遵循单分子层吸附机理. 在相同的温度、压力和比表面积条件下, 氢同位素气体在微孔分子筛上的吸附容量比介孔分子筛上的大, 这是由于在吸附剂微孔内吸附势场叠加所致, 并通过构建的吸附势模型, 较好地解释了该实验结果.

关键词: 氢同位素 分子筛 吸附势 模型

Relationship Between the Adsorption Capacity of Hydrogen Isotopes and Specific Surface Area of Adsorbents

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Abstract:

The equilibrium adsorption capacity of hydrogen and deuterium on different micro- and mesoporous molecular sieve adsorbents and the specific surface area were measured at 77 K with a volumetric method. The results indicate that a good linear relationship was observed between the adsorption capacity of hydrogen isotopes and the specific surface area for the same kind of adsorbents, which provided a convincing proof of the monolayer adsorption mechanism for hydrogen isotopes at supercritical temperature. The adsorption capacity on microporous molecular sieves was larger than that on mesoporous molecular sieves at the same temperature, pressure and specific surface area, which was attributed to the overlapping of adsorption potential in micropores of adsorbents. An adsorption potential model was proposed that could be used to explain this experimental results well.

Keywords: Hydrogen isotope Molecular sieve Adsorption potential Model

收稿日期 2007-10-08 修回日期 1900-01-01 网络版发布日期

DOI:

基金项目:

通讯作者: 褚效中

作者简介:

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