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## **C1Po3D-02: Study on Helium Adsorption Properties of Carbon Nanotubes in the Liquid Helium Temperature Range Based on the Monte Carlo Method**

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The sorption pump is a critical component of helium sorption cryocoolers operating in the liquid helium temperature range. Current research on porous materials for sorption pumps predominantly focuses on activated carbon, with limited exploration of alternative porous materials such as carbon nanotubes. Due to differences in elemental composition and molecular structure, the helium adsorption capacity of these materials remains unclear. In this study, a molecular model of carbon nanotubes was established based on the Monte Carlo method to numerically calculate the adsorption capacity of helium-4 over a pressure range of 10-200 kPa and a temperature range of 4-70 K. Additionally, an experimental setup was developed to measure the cryogenic adsorption capacity of porous materials, and corresponding experiments were conducted. The findings of this research provide valuable insights for optimizing sorption pump materials.

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