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CO_2 adsorption on single-walled dahlia-like carbon nanohorns[1]

JAIME BOHORQUEZ, VAIVA KRUNGLEVICIUTE, ALDO MIGONE, Department of Physics, Southern Illinois University, MASAKO YUDASAKA, SUMIO IIJIMA, National Institute of Advanced Industrial Science and Technology — The adsorption of CO_2 on spherical aggregates of as-produced (i.e., closed) dahlia-like single-walled carbon nanohorns was investigated. We conducted volumetric adsorption measurements at five temperatures between 147 and 180 K. The shape of the isotherms for CO_2 is very different from those measured with neon and CF_4. For CO_2 there is a single, smeared step in the adsorption data between the lowest coverages and saturation. By contrast, Ne and CF_4 show two distinct substeps on the same substrate. The isosteric heat was also obtained and its dependence on coverage also showed an usual behavior: it increased with increasing coverage. The isosteric heat decreases with coverage both for Ne and CF_4. The stronger intermolecular interactions present for CO_2 probably are responsible for this adsorbate's unusual behavior. Comparisons with the behavior reported in the literature for CO_2 on SWNTs, which shows similar unusual characteristics, will also be made.

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Vaiva Krungleviciute

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