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Neutron diffraction and thermodynamics of deuterium adsorption in amorphous carbon materials with a uniform pore network. LILLIAN FRAZIER, University of Tennessee, TOM ARNOLD, ORNL CSD, THOMAS HANSEN, MIGUEL GONZALEZ, ILL, DAVID MARTIN Y MARREO, ISIS, SHENG DAI, ZUOJAIN LI, DAVID BEACH, ORNL CSD, JOHN Z. LARESE, University of Tennessee/ ORNL CSD — A coordinated thermodynamic and neutron diffraction investigation of the sorption properties of D₂ within an amorphous carbon material with a uniform, close-packed network of open pores has been undertaken. The volumetric adsorption studies are used to determine the gas capacity, the heat of adsorption and as a guide to the neutron diffraction experiments. By combining the results of the thermodynamic measurements with the findings in the structural measurements a precise description of structure of the adsorbed phase as a function of gas filling is possible. Because the pores in these carbon materials are unequivocally open these findings have a direct impact on the interpretation of earlier adsorption and diffraction experiments involving carbon nanotubes.

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