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Structure and thermodynamics of a Neon monolayer adsorbed on carbon nanotube bundles OSCAR VILCHES, MICHEL BIENFAIT, Universite de la Mediterranee, MARK JOHNSON, STEPHANE ROLS, ILL, Grenoble, SUBRAMANIAN RAMACHANDRAN, University of Washington — We report results from neutron diffraction measurements of five submonolayer coverages of Ne adsorbed on single-wall, closed-end carbon nanotube bundles (SWCNB). Our recent thermodynamic study of Ne adsorbed on SWCNB, Phys. Rev. B, 76, 075404 (2007), showed one-dimensional (1d) solid behavior below 4K at doses less than 0.08 monolayer, which crossed over to 3d-like behavior above 16K without signature of a phase transition. Above 0.18 monolayer there is a 2d-like solid behavior below 8K, with Debye temperatures in the 45 to 53K range, similar to those found for 2d Ne/graphite, but there is no melting transition at 13.5K as seen in 2d. Our structure measurements on Ne adsorbed on SWCNB similar to those used for the thermodynamic study were performed at 2K using beam line D20 at ILL. Results show the shift from a 1d to a 2d solid structure with increasing coverage. Lattice parameters, the relationship between the thermodynamic and structural measurements, and theoretical expectations will be shown and discussed.

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