From $^3$He to Xe: adsorption isotherms on the same batch of BuckyPearls$^TM$ carbon nanotube bundles$^1$ OSCAR VILCHES, EVAN MATTSON, KRISTINE KIM, DAVID COBDEN, University of Washington — We report a study of the adsorption of $^3$He, $^4$He, H$_2$, HD, D$_2$, Ne, Ar, N$_2$, Kr and Xe adsorbed on samples of BuckyPearls$^TM$, a form of HiPCo-type$^TM$ carbon nanotube bundles, from the same batch used for neutron diffraction studies of the structure of $^4$He and Ne at low temperatures. For each gas, except $^3$He and $^4$He, we have measured three or more isotherms in a range of temperatures where we can observe the completion of both the three-line phase and the first layer. We can correlate the helium and hydrogen isotopes data and the Ne data with previous neutron and/or heat capacity measurements on BuckyPearls and HiPCo bundles. By taking ratios of monolayer completion coverage for the various gases to the N$_2$ monolayer completion coverage we can compare nanotube adsorption to adsorption on exfoliated graphite. Quantum effects on adsorption can be seen by comparing areas per atom or molecule to Lennard-Jones hard core radii.

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