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Neutron and Thermodynamic Investigation of n-Butane Adsorption on MgO(100) Surfaces SAMI CHANAA, University of Tennessee, RICK COOK, University of Tennessee, TOM ARNOLD, Oak Ridge National Laboratory, T. RAMIREZ-CUESTA, ISIS, Rutherford Appleton Laboratory, S. CLARKE, University of Cambridge, JOHN LARESE, Oak Ridge National Laboratory, University of Tennessee — The adsorption properties of thin films normal butane films adsorbed on the MgO (100) surface were investigated using neutron scattering and volumetric isotherm techniques. A series of high-resolution, adsorption isotherm measurements were performed between 145K and 200K using an automated volumetric adsorption apparatus. These data were used to determine both the two-dimensional isothermal compressibility and the isosteric heat of adsorption and to identify regions where phase transitions might occur. Evidence is found for the presence of two layering transitions. Using neutron diffraction. We find that at low temperatures monolayer butane forms a commensurate solid phase that is commensurate with the underlying MgO (100) surface. Inelastic neutron spectroscopy was used to gain some preliminary indications of the dynamical response of the butane solid phase. Comparisons of the neutron spectra with calculations of the molecular-vibrational modes will be made.

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