

Abstract Submitted  
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**Neutron Scattering And thermodynamic Investigations of Hydrogen Adsorbed on or within Nanomaterials**<sup>1</sup> LILLIAN FRAZIER, RICHARD COOK, University of Tennessee, TOM ARNOLD, Diamond Facility, RAL, ANNIBAL CUESTA-RAMIREZ , ISIS neutron Facility, JOHN LARESE, Univ. of Tenn / ORNL — Nanometer scale materials offer neutron scatters significant opportunities to investigate the adsorption or entrainment properties of hydrogen bearing molecular gases and liquids. We report our latest investigations of combined thermodynamic, computation, neutron diffraction and inelastic scattering (INS) studies of the structure and dynamics of H<sub>2</sub> films adsorbed on MgO (100) surfaces and entrained within an oriented, ordered- hexagonal array of cylindrical tunnels within an alumina or amorphous carbon matrix. By combining the INS data with our neutron diffraction results using D2 on the same materials and with computational efforts we propose adsorption behavior that accounts for our findings. Finally, we indicate what other opportunities exist for future experiments in these areas.

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