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NMR Characterization of Hydrogen Adsorption and Pore Structures of Carbon-Based Materials[1] B.J. ANDERSON, ALFRED KLEINHAMMES, YUE WU[2], Department of Physics and Astronomy, University of North Carolina, Chapel Hill, NC 27599-3255, UNIVERSITY OF PENNSYLVANIA DEPARTMENT OF CHEMISTRY COLLABORATION, LAWRENCE LIVERMORE NATIONAL LABORATORY COLLABORATION — Hydrogen adsorption in carbon-based materials such as boron-doped graphite and carbon aero gels were investigated by nuclear magnetic resonance (NMR). ^{1}H NMR is shown to be a sensitive and quantitative probe for detecting adsorbed gas molecules such as H_2, methane, and ethane. NMR measurements were carried out in-situ under given H_2 pressure up to a pressure of over 100 atm, at room temperature and 100 K. From such ^{1}H NMR measurement, the amount of adsorbed H_2 molecules was determined versus pressure. In addition to measuring adsorption binding energies via isotherms, the structure and distribution of the nanopores within the material were characterized in order to relate the size of the pores to the rate of diffusion of the H_2 to the adsorption sites.

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