

Abstract Submitted
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Study on Hydrogen Interaction with Graphene, Graphene Hydroxide, and Lithiated Graphene S. ADAK, University of Tennessee, A.I. ACATRINEI, L.L. DAEMEN, Los Alamos National Laboratory, B. ESTES, University of Tennessee, M.H. HARTL, Los Alamos National Laboratory, J.Z. LARESE, University of Tennessee — Neutron vibrational spectroscopy, together with adsorption isotherm measurements, has been employed to investigate interaction of hydrogen with graphene, hydroxylated graphene, and lithium incorporated graphene. The adsorption studies of hydrogen on these materials indicate varying degrees of hydrogen storage capacity. Graphene is found to have significantly higher hydrogen uptake than graphite and graphite oxide. Neutron vibrational spectroscopy provides direct information concerning hydrogen dynamics including the occurrence of the rotational mode at 119 cm⁻¹; slightly below the free rotor position observed for H₂ rotation on graphite. We have also explored how the interaction of hydrogen changes when hydroxyl groups are attached onto the graphene surface and when lithium is incorporated into graphene. The outcome of these studies will also be discussed.

Sourav Adak
Department of Chemistry, University of Tennessee

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