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Clathrate hydrates studied by diffraction and vibrational spectroscopy. TIMOTHY JENKINS, Carnegie Institution of Washington, RUSSELL HEMLEY, Carnegie Institution of Washinton, WENDY MAO, Los Alamos National Laboratory, HO-KWANG MAO, BURKHARD MILITZER, VIKTOR STRUZHKIN, Carnegie Institution of Washington — Clathrate hydrate structures are a potentially viable method for hydrogen storage (Mao and Mao 2004). For simple hydrogen-water clathrates, low temperatures (<150 K) or high pressures (>2 kbar) are needed for stability. We investigated, using inelastic neutron spectroscopy, the hydrogen storage character of a clathrate of hydrogen with the addition of tetrahydrofuran as a promoter molecule. The addition of tetrahydrofuran allows the formation of the clathrate structure at elevated temperature and decreased pressure as compared to the hydrogen clathrate (Lee, et al. 2005). In addition we have examined the higher pressure clathrate forms at lower temperatures. High pressure diamond anvil work has allowed Raman and x-ray spectroscopy on novel clathrate environments. Analysis these model compounds will assist in future investigations to additional clathrate compounds.

Lee, Huen, et al. “Tuning Clathrate Hydrates for Hydrogen Storage.” *Nature* 434 (April 2005): 743-746. Mao, Wendy, and Ho-kwang Mao. “Hydrogen Storage in Molecular Compounds.” *Proceedings of the National Academy of Sciences* 101, no. 3 (2004): 708-710.

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