

440c Adsorption of Hydrogen and Methane in Metal-Organic Frameworks

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Depletion of fossil fuels has launched a search for alternative sources of energy. Hydrogen and methane gases have proven to be feasible alternatives, but the utilization of these gases as fuels has been limited by the lack of a suitable means to store them. Metal-Organic Frameworks (MOFs) provide the characteristics necessary in such a storage medium, including reversible uptake of gases. In order to optimize the storage capacity of MOFs, the framework-gas interactions must be studied and understood. This has been achieved by analyzing the perturbations experienced by the Raman active vibrational modes of both hydrogen and methane. In the spectra of both gases, bands for the free gas are observed, along with lines shifted to lower frequency, due to adsorbed gas molecules. Thus, Raman spectroscopy provides useful information about the interactions between sorbate and sorbent, shedding light on the appropriate MOF design for optimal gas uptake and delivery.