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Intercalative Investigation of Hydrogen-Bonded Clay Mimics. A.M. Beatty, Dept. of Chemistry, Mississippi State Univ., Mississippi State, MS 39762.

We have recently become interested in clay mimics because of their rich diversity of chemical applications. They are known to intercalate or absorb gases, small molecules and ions, and thus serve as materials capable of storage, chemical separations, and catalysis. Further, clays, unlike zeolites, are anisotropic solids, so that 2-D (in addition to 3-D) functionality can be accessed. The sheet structure of naturally occurring clays is held together by strong metal oxide bonds, therefore intercalation of small molecules is possible. Our “clay mimics” comprise hydrogen-bonded organic and coordination complexes, and the sheet structure is maintained by (relatively weak) hydrogen bonds. The question is: Are hydrogen-bonded layers strong enough to withstand the disruption caused by intercalation and/or loss of guest molecules?

The synthesis and solid state structure “clay mimics” both organic and hydrogen-bonded coordination complexes, including pillared layered structures, single-layer and bilayer architectures, will be discussed. In addition, thermal, physical and mechanical properties of organic and inorganic clay mimic structures will be compared