Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Design of Multi-Decker Incorporated Metal Organic Frameworks for Hydrogen Storage KIRAN BOGGAVARAPU, McNeese State University, ANIL KANDALAM, McNeese Sate University — Metal Organic Frameworks (MOFs) are a new class of rationally designed microporous hybrid (organic-inorganic) materials. They have recently gained attention as potential hydrogen storage systems with gravimetric density meeting the DOE 2015 targets of 9 wt%. However, due to weak interaction between the molecular hydrogen and the host MOF (see figure), high pressures are required to reach the target storage levels. Recently, multi-decker organometallic complexes are shown to exhibit the ideal thermodynamics and kinetics for hydrogen storage. However, it is not clear if these multi-decker complexes can retain their hydrogen storage capability when assembled into a bulk-material. In this presentation, we investigate the hydrogen storage capability of a new class of materials by combining the strengths of MOFs and decker complexes. An ideal way to integrate these two systems is to incorporate the multi-deckers into the structural framework of MOFs. In these hybrid materials, the multi-decker units are expected to maintain their structural integrity and there by retaining the hydrogen storage capacity with an added advantage of being a part of stable porous MOF back-bone.

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Date submitted: 26 Nov 2008 Electronic form version 1.4