

Subject: MSD Colloquium, Long, Thurs, 11/01, 11am, 212, A-157
From: Suzanne Kokosz <kokosz@anl.gov>
Date: Mon, 10 Sep 2007 11:20:02 -0500
To: Materials Science Division <msd@anl.gov>

MATERIALS SCIENCE COLLOQUIUM

SPEAKER: PROF. JEFFREY R. LONG
University of California, Berkeley

TITLE: ^3H Hydrogen Storage in Microporous Coordination Solids with Exposed Metal Sites²

DATE: Thursday, November 01, 2007

TIME: 11:00 a.m.

PLACE: Building 212, Room A-157

HOST: John Schlueter

Refreshments will be available at 10:45 a.m.

Abstract:

Materials exhibiting reversible hydrogen adsorption with high gravimetric and volumetric capacities are sought for use in on-board storage systems of hydrogen fuel cell-powered vehicles. Microporous coordination solids with high internal surface areas have been shown to display excellent storage properties, but only at cryogenic temperatures. Methods for synthesizing frameworks bearing coordinatively-unsaturated metal centers are therefore being developed as a means of increasing the H₂ adsorption enthalpy. The porosity and hydrogen storage properties of the dehydrated Prussian blue analogues Ga[Co(CN)₆], Fe₄[Fe(CN)₆]₃, and M₃[Co(CN)₆]₂ (M = Mn, Fe, Co, Ni, Cu, Zn) have been investigated in detail. Means of incorporating metal carbonyl units within Zn₄O(1,4-benzenedicarboxylate)₃ have been devised, and attempts at decarbonylating the resulting materials will be described. In addition, the use of pyrazole- and tetrazole-based ligands for generating frameworks with open metal coordination sites will be discussed, with emphasis on a new sodalite-type framework exhibiting a high volumetric hydrogen storage capacity.

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