Abstract Submitted
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Hydrogen Storage in Cu-Li-Mg Alloys[1] M. HELENA BRAGA[2], GEORGE CHERTKOV, ALICE ACATRINEI, SAURABH KABRA, LUKE DAEMEN, LANSCE-LC, LANL, Los Alamos, NM 87545, USA — $CuMg_2$ has an orthorhombic crystal structure (Fddd) and does not form a hydride. However $CuLi_xMg_{2-x}$ (x $\sim$ 0.11) has a hexagonal crystal structure ($P6_222$), just like $NiMg_2$, a compound known for its hydrogen storage properties. A comparison between the phase diagrams of the systems Cu-Mg and Ni-Mg shows that these binary systems form compounds with similar stoichiometry. $NiMg_2$ is formed by peritectic reaction of the elements at 759 °C (1032 K) and $CuMg_2$ at 568 °C (841 K) by congruent melting. Since the energy of formation of the hydride is related to that of the primary alloy, it was hypothesized that $CuLi_xMg_{2-x}$ might also be a hydrogen storage material similar to $NiMg_2$. Presumably, its advantage would be that it would release hydrogen at a lower temperature (possibly close to room temperature). In order to determine the properties of the hydrogenated (and deuterated) $CuLi_xMg_{2-x}$ material, absorption/desorption experiments were performed at several temperatures and under different pressures of H_2 (and D_2). Neutron diffraction patterns and neutron vibrational spectra were collected to elucidate the behavior of hydrogen in the Li-doped $CuMg_2$ intermetallic.

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