MS13-P3 **Reactions of the $2LiBH_4$-Mg_2FeH_6 assemblage for hydrogen storage**. Michele Catti, Mohammad R. Ghaani, Angeloclaudio Nale. *Dipartimento di Scienza dei Materiali, Università di Milano Bicocca, Milano, Italy.*
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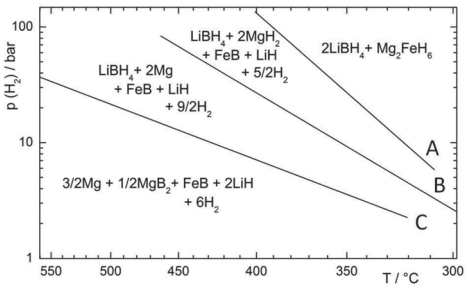
Both $LiBH_4$ and Mg_2FeH_6 are important materials for hydrogen storage, with a high gravimetric (13.9 wt%) and a high volumetric (150 kg m^{-3}) H_2 density, respectively.[1,2] However, they are thermodynamically more stable than desired, so as to decompose at rather high temperatures with important exchanged heat values. This issue can be addressed by stabilizing the dehydrogenation products through joint decomposition of the hydrides, in order to reduce and increase the overall reaction enthalpy and entropy, respectively.[3] With this aim, the sequence of dehydrogenation reactions of the $2LiBH_4$-Mg_2FeH_6 composite was studied by PCI (Pressure-Composition-Isotherm) and TPD (Temperature-Programmed-Desorption) techniques in a Sievert apparatus. Produced phases were identified by ex-situ X-ray powder diffractometry (CuK radiation) on samples protected from air contact. Three distinct plateaus are detected on each isotherm: A, B, and C on decreasing pressure. The A reaction, involving formation of FeB, MgH_2 and LiH, occurs at higher pressure/lower temperature than dehydrogenation of either pure hydrides; these are then effectively destabilized. For instance, at 30 bar of H_2 pressure the composite decomposes at 350 °C, whereas pure Mg_2FeH_6 would release H_2 only at 455 °C, and $LiBH_4$ even at 580 °C. Also MgH_2 would require heating to 425 °C to decompose at 30 bar. The B process is plain decomposition of MgH_2, and in C the magnesium produced reacts with $LiBH_4$ left forming MgB_2 and LiH. The B+C sequence is fully reversible, and it corresponds to two-step dehydrogenation of the $LiBH_4/MgH_2$ system.[4] Reaction enthalpies and entropies were obtained through van't Hoff plots $\ln(p/p_0) = \Delta_r S/R - (\Delta_r H/R)(1/T)$ of all three processes (cf. the straight lines in the Figure below), thus providing a full thermodynamic characterization of the system.



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Keywords: hydrogen storage material; dehydriding reaction; van't Hoff plot

MS13-P4 **Mixed-metal precursors for mixed-metal oxides.** Claire-Lise Chanez,[a] Katharina M. Fromm,[a] [a]*Chemistry Departement, University of Fribourg, Switzerland*
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Heterometallic compounds can be used in different applications, for instance as precursors for photo-electronic devices or mixed-metal oxides in high-T_c superconductors. A synthetic strategy to obtain mixed-metal oxides is to use decomposition techniques on multi-metallic complexes. Since the organic ligand is decomposed during the synthesis of the desired metal oxide, it is proposed that simple ligand systems, which can be easily and cost-effectively prepared on a multi-gram scale, are used.

The preorganization of the metal ions in the complex may give large advantages for the thermal decomposition. The oxide can be obtained under milder conditions (atmospheric pressure and temperatures lower than 500 °C)[1] and new

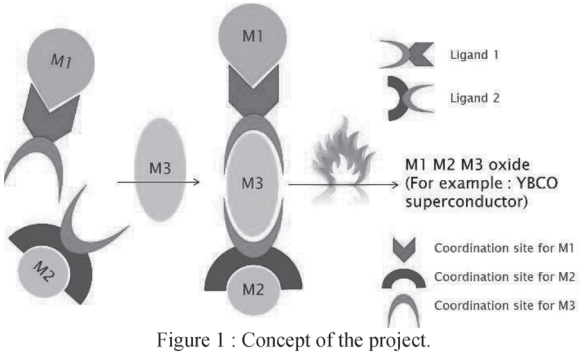

Figure 1 : Concept of the project.

oxide materials can be synthesized.

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Keywords: precursor; oxide, superconductor