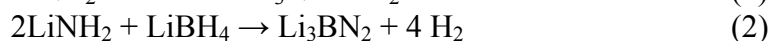
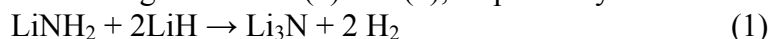


AMIDE-HYDRIDE COMBINATION FOR HYDROGEN STORAGE

Ping Chen

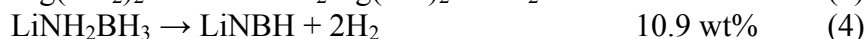
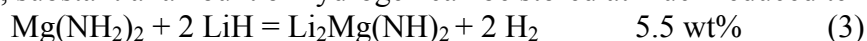
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The Interactions between N-H contenting chemicals and hydrides produce hydrogen. ¹ Such strong interactions enable those substances potential materials for hydrogen storage. In the previous investigations, ~ 10.5wt.% and 11.9 wt.% of hydrogen storage capacities were achieved in lithium amide-lithium hydride and lithium amide-lithium borohydride systems, systems through reactions (1) and (2), respectively. ^{1,2}



However, relatively high operating temperatures place a serious restriction onto the application of those substances. To lower down the operation temperatures the composition and structure of the subject material have to be altered in order to sit within a suitable thermodynamic range. In the same time catalytic modification is needed to improve the kinetics of the reaction.

Continuous efforts in the materials development lead to the discovery of a number of novel amide-hydride complexes. In this talk I will present two interesting systems, i. e., magnesium amide-lithium hydride complex ³⁻⁵ and alkali amidoborane system. ⁶ Through reactions (3) and (4), substantial amount of hydrogen can be stored at much reduced temperatures.



Among all variables that affect the kinetics of a heterogeneous solid state reaction, mass transport and reaction at the surface or interface(s) are the two common rate-determining processes. It was found that the interface reactions between amide-imide and imide-hydride are slow step in the reaction (3). Conventional transition metals have little catalytic effect on the dehydrogenation of those amide-hydride complexes. Interestingly, K work well for the $\text{Mg}(\text{NH}_2)_2$ -LiH system. ⁷ The details of the kinetic improvement and the identification of reactive species will be presented.

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