

Reaction mechanism and kinetics of MgH₂/borohydrides based Reactive Hydride Composites

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Reactive Hydride Composites like combinations of MgH₂ with M(BH₄)_x (M being Li, Na or Ca) show significantly reduced values of reaction enthalpies as well as improved ab- and desorption kinetics compared to the pure borohydrides. Furthermore, due to their high reversible gravimetric storage capacities of up to 11 wt.% they are promising candidates for future hydrogen storage applications.

However, in spite of the significantly lowered value of reaction enthalpy and thus a high thermodynamic driving force for desorption at temperatures below 200°C hydrogen release still takes place at higher temperatures only.

In this presentation, an overview will be given on reaction mechanisms, thermodynamic properties and sorption behaviour of the nanocrystalline RHCs: 2LiBH₄+MgH₂, 2NaBH₄+MgH₂ and Ca(BH₄)₂+MgH₂. The progress in the optimisation of reaction kinetics reached so far will be described. Function and suitability of additives as potential catalysts on hydrogen ab- and desorption will be discussed.