Supporting Information

**NbN nanoparticles as additive for the high dehydrogenation properties of LiAlH\textsubscript{4}**

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![Graph](image.png)

*Fig. S1* The onset dehydrogenation temperature and dehydrogenation peak temperatures (R1b and R2) of DSC for as–received LiAlH\textsubscript{4} (received), as–milled LiAlH\textsubscript{4} (milled) and x%NbN–LiAlH\textsubscript{4} (x=1, 2, 4, 6 and 8) samples.

![Graph](image2.png)

*Fig.S2* Hydrogen desorption curves of 1%NbN–LiAlH\textsubscript{4}, 2% NbN–LiAlH\textsubscript{4}, 4% NbN–LiAlH\textsubscript{4}, 6% NbN–LiAlH\textsubscript{4} and 8% NbN–LiAlH\textsubscript{4} samples after ball milling. (Heating ramp 2 °C/min)
Fig. S3 XRD patterns for the as–milled LiAlH₄ and x%NbN–LiAlH₄ (x=1, 2, 4, 6 and 8) samples after ball milling.

Fig. S4 SEM image of (a) as–received LiAlH₄ (b) 1%NbN–LiAlH₄, (c) 2%NbN–LiAlH₄, (d) 4%NbN–LiAlH₄, (e) 6%NbN–LiAlH₄ and (f) 8%NbN–LiAlH₄ samples after ball milling, respectively.
Fig. S5 JMA plots for the first-step isothermal dehydrogenation.

Fig. S6 Arrhenius plots for the dehydriding kinetics of NbN–LiAlH₄ sample.

Fig. S7 FTIR spectra of the 8%NbN–LiAlH₄ sample after HP–DSC under 4.5 MPa and 5.5 MPa H₂.