Electronic Supplementary Material (ESI) for Dalton Transactions

Hydrogen Storage of a Novel Combined System of $LiNH_2$–$NaMgH_3$: Synergistic Effects of *in situ* Formed Alkali and Alkaline-Earth Metal Hydrides

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Electronic supplementary information

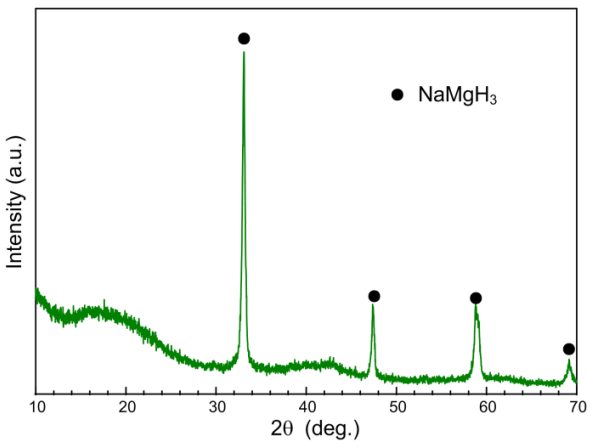

Figure S1. XRD pattern of as-prepared $NaMgH_3$.

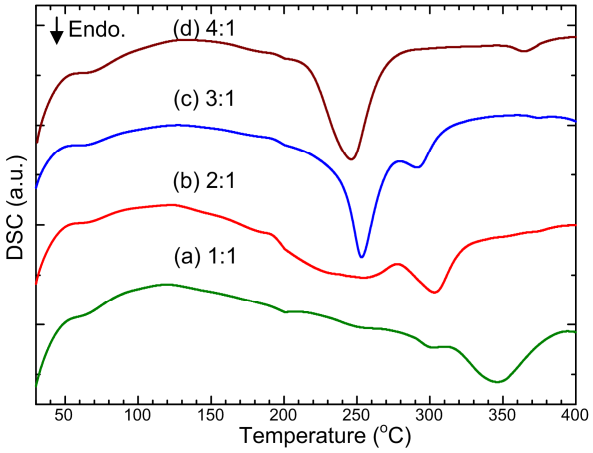

Figure S2. Comparison of DSC curves for $LiNH_2$–$NaMgH_3$ composites with different molar ratios: (a) 1:1, (b) 2:1, (c) 3:1 and (d) 4:1. The ramping rate is 10 ºC/min.

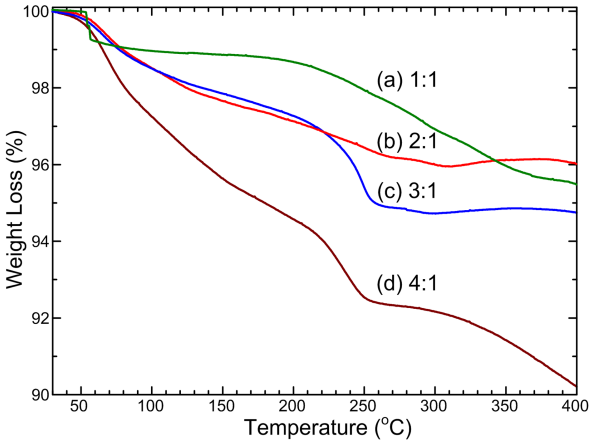

Figure S3. Comparison of TG curves for $LiNH_2$–$NaMgH_3$ composites with different molar ratios: (a) 1:1, (b) 2:1, (c) 3:1 and (d) 4:1. The ramping rate is 10 ºC/min.

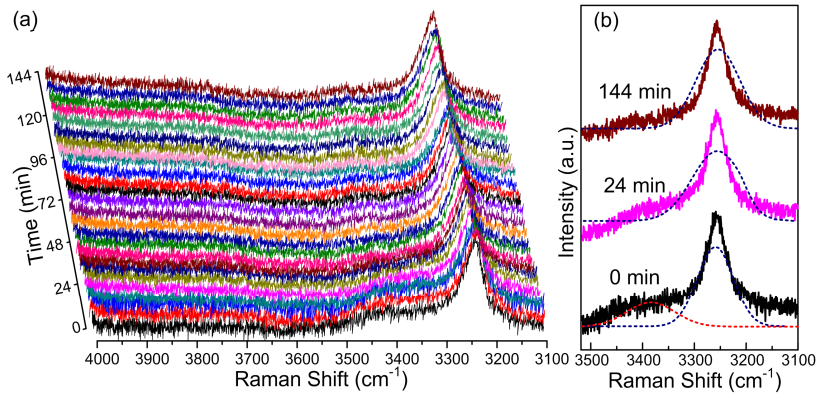

Figure S4. (a) Time-resolved Raman spectra in the N–H stretching spectral region for the $2LiNH_2$–$NaMgH_3$ composite during the dehydriding process at 300 ºC, and (b) the expanded view of Fig. S4 (a) in the range of 3100–3500 cm^{-1} in two dimensions for the sample maintained at 300 ºC for 0, 24 and 144 min, respectively.

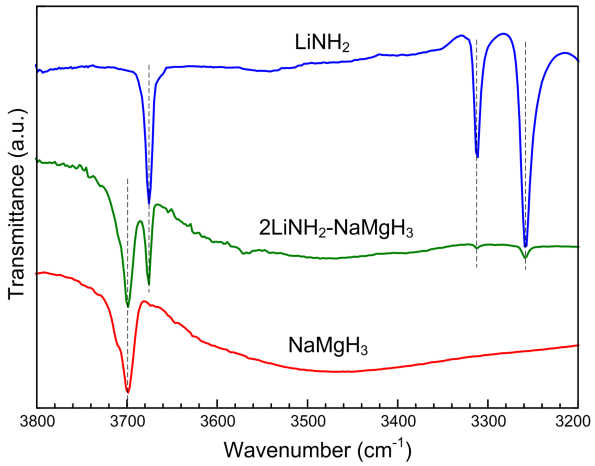

Figure S5. Comparison of FTIR spectra for $2LiNH_2$–$NaMgH_3$, $LiNH_2$ and $NaMgH_3$ samples.

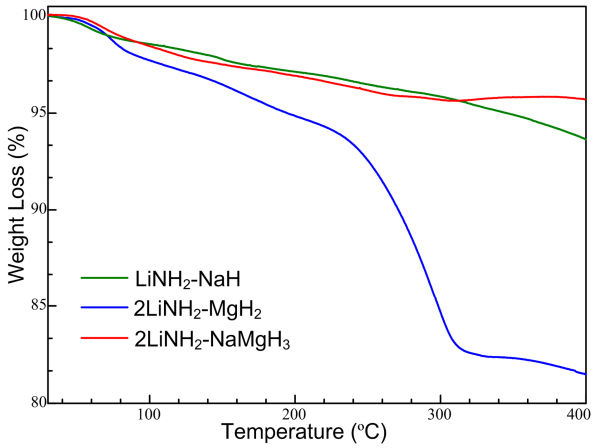

Figure S6. Comparison of TG curves for $2LiNH_2$–$NaMgH_3$, $2LiNH_2$–MgH_2 and $LiNH_2$–NaH composites.

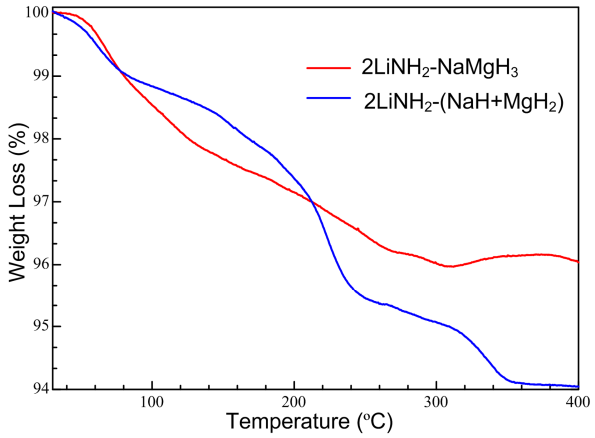

Figure S7. Comparison of TG curves for $2LiNH_2$–$NaMgH_3$ and $2LiNH_2$–($NaH+MgH_2$) composites.

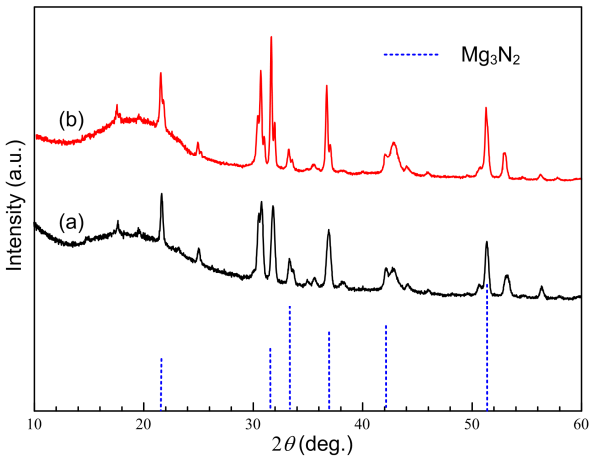

Figure S8. XRD patterns (top) for the re-hydrogenated $2LiNH_2$–$NaMgH_3$ composite after one ((a), black line) and four ((b), red line) cycle with reference (bottom) of Mg_3N_2 (dotted blue line, JCPDS 35-0778).

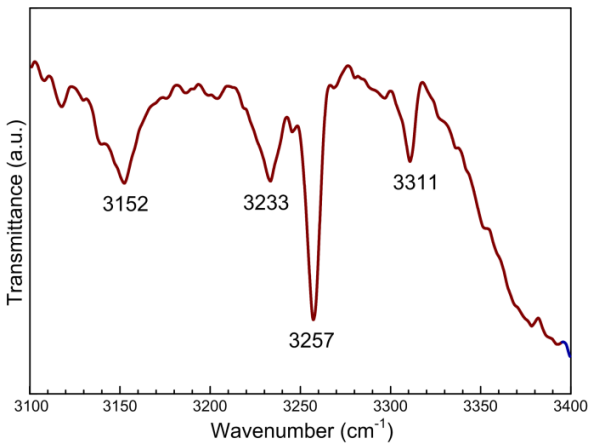

Figure S9. FTIR spectrum of the re-hydrogenated $2LiNH_2$–$NaMgH_3$ composite.