Hydrogen Storage of a Novel Combined System of LiNH₂–NaMgH₃: 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 NaMgH₃.
Figure S2. Comparison of DSC curves for LiNH₂–NaMgH₃ composites with different molar ratios: (a) 1:1, (b) 2:1, (c) 3:1 and (d) 4:1. The ramping rate is 10 °C/min.

Figure S3. Comparison of TG curves for LiNH₂–NaMgH₃ composites with different molar ratios: (a) 1:1, (b) 2:1, (c) 3:1 and (d) 4:1. The ramping rate is 10 °C/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 °C, 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 °C 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 2LiNH₂–NaMgH₃ composite after one ((a), black line) and four ((b), red line) cycle with reference (bottom) of Mg₃N₂ (dotted blue line, JCPDS 35-0778).

Figure S9. FTIR spectrum of the re-hydrogenated 2LiNH₂–NaMgH₃ composite.