Electronic Supplementary Information

For

"Facile solid-phase synthesis of diammoniate of diborane and its thermal decomposition behaviors"

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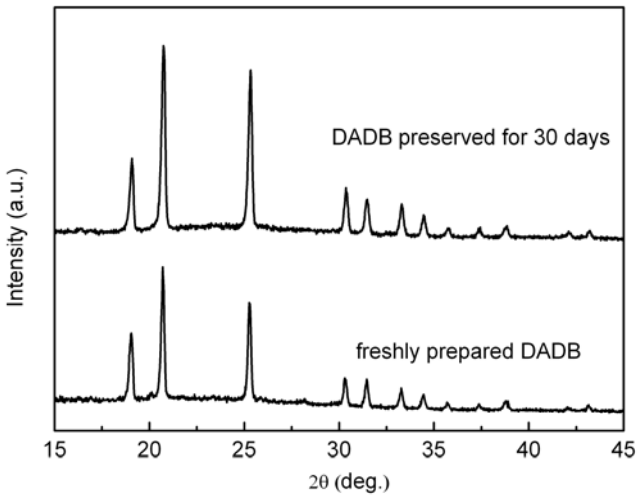

Fig. S1. XRD patterns of the DADB samples that were freshly prepared and preserved for 30 days, respectively.

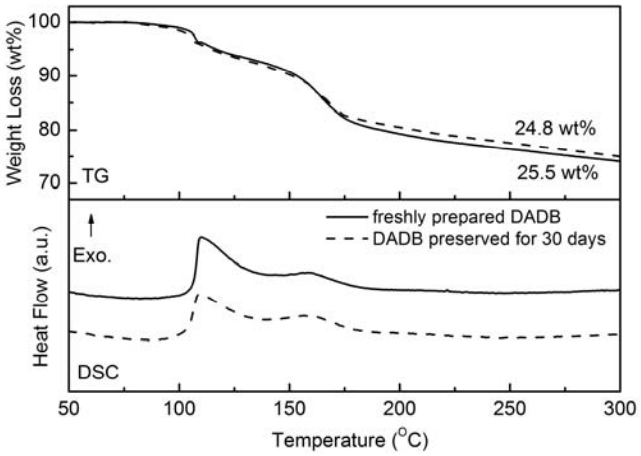

Fig. S2. Comparison of TG/DSC profiles of the DADB samples that were freshly prepared and preserved for 30 days, respectively. The heating rate was 5 °C min^{-1}.

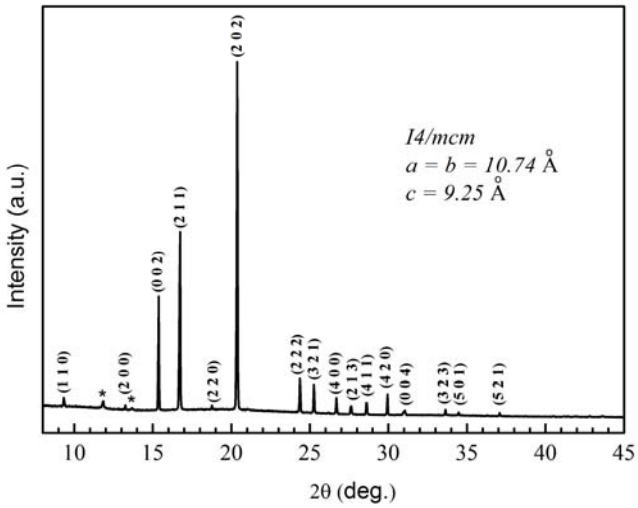

Fig. S3. Synchrotron X-ray diffraction pattern of pure DADB sample. The XRD data was analyzed by the CMPR program (B. H. Toby, *J. Appl. Crystallogr.*, 2005, **38**, 1040). The diffraction peaks marked with asterisks might result from unknown phase in the purified sample.

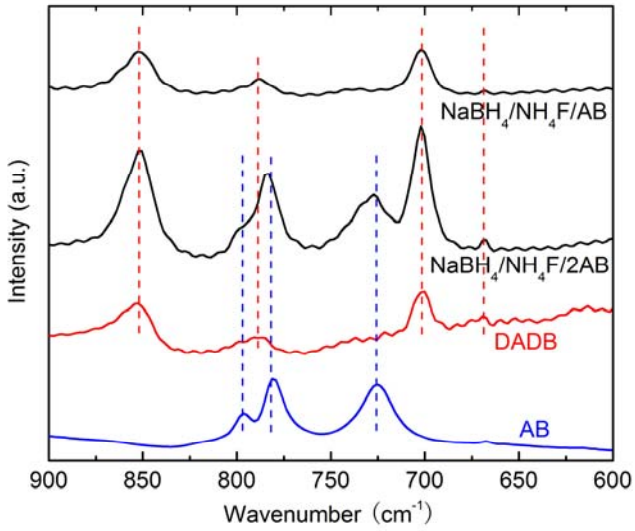

Fig. S4. The FTIR patterns (B-N stretching vibration region) of the $NaBH_4/NH_4F/AB$ and $NaBH_4/NH_4F/2AB$ samples after milling for 20 min. For comparison, the FTIR patterns of DADB and AB were also included.

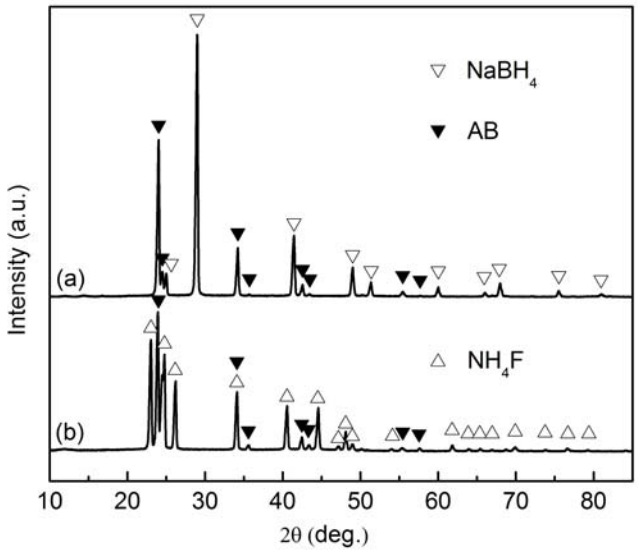

Fig. S5. XRD patterns of the samples after milling for 20 min: (a) $NaBH_4$+AB; (b) NH_4F+AB.

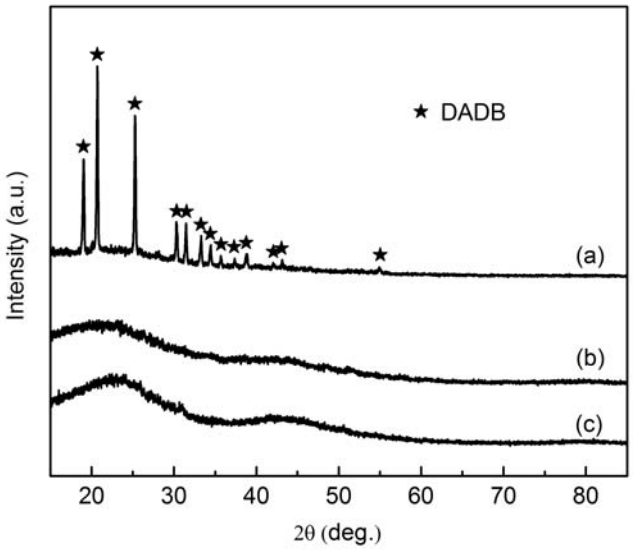

Fig. S6. XRD patterns of (a) pristine DADB and post-heated DADB samples at (b) 130 °C and (c) 300 °C.

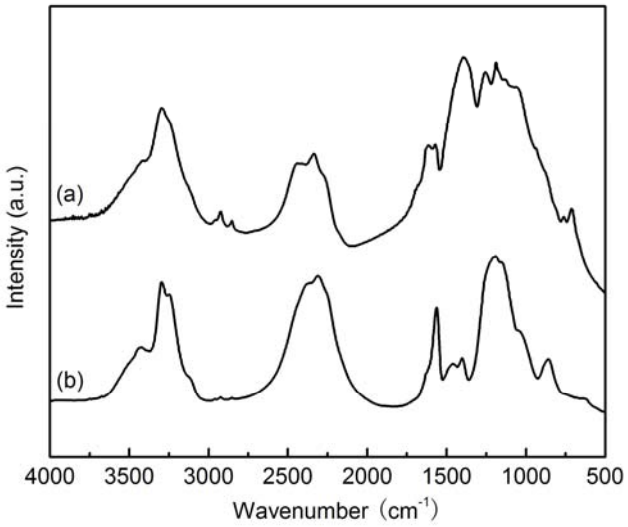

Fig. S7. FTIR patterns of (a) post-heated DADB sample at 130 °C and (b) PAB.

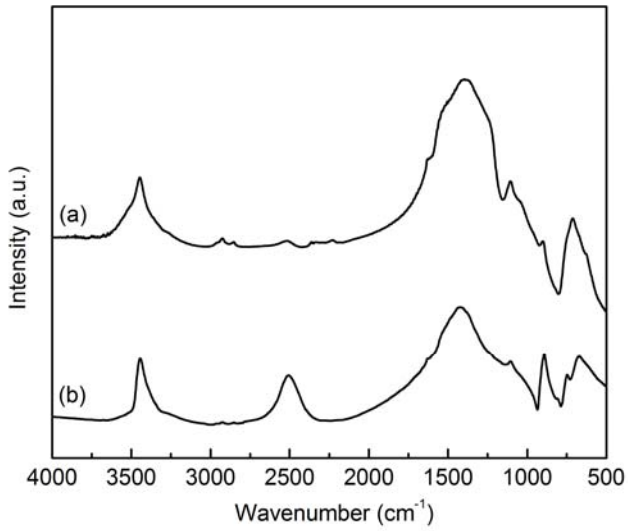

Fig. S8. FTIR patterns of (a) post-heated DADB sample at 300 °C and (b) PIB.

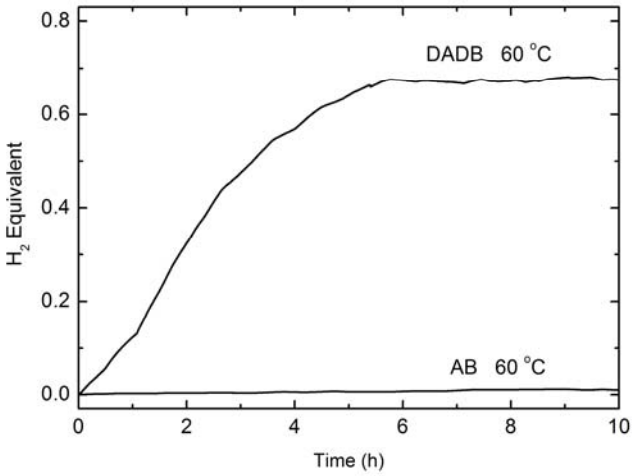

Fig. S9. Isothermal decomposition profiles of DADB and AB at 60 °C by using volumetric method.

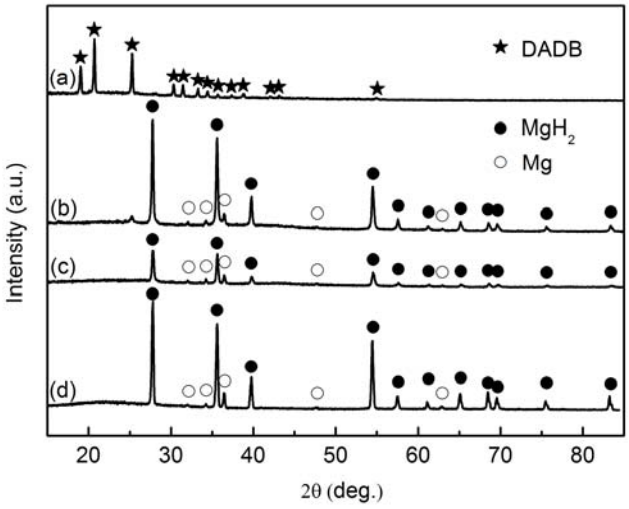

Fig. S10. XRD patterns of (a) DADB; (b) post-milled DADB/MgH_2 sample; (c) post-heated DADB/MgH_2 sample at 300 °C and (d) MgH_2 starting material containing a small amount of Mg.

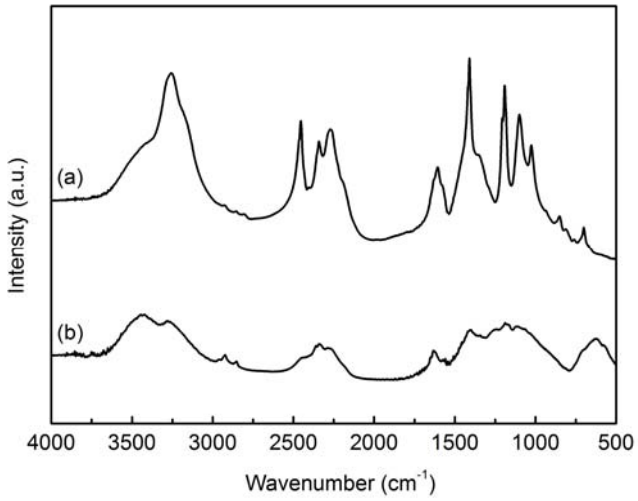

Fig. S11. FTIR patterns of (a) DADB and (b) post-milled DADB/MgH_2 samples.