Supplementary Information:

Enhanced hydriding-dehydriding performance of 2LiH-MgB$_2$ composite by the catalytic effects of Ni-B nanoparticles

Jie Shao, Xuezhang Xiao, Lixin Chen[*], Xiulin Fan, Leyuan Han, Shouquan Li, Hongwei Ge, Qidong Wang

Key Laboratory of Advanced Materials and Applications for Batteries of Zhejiang Province

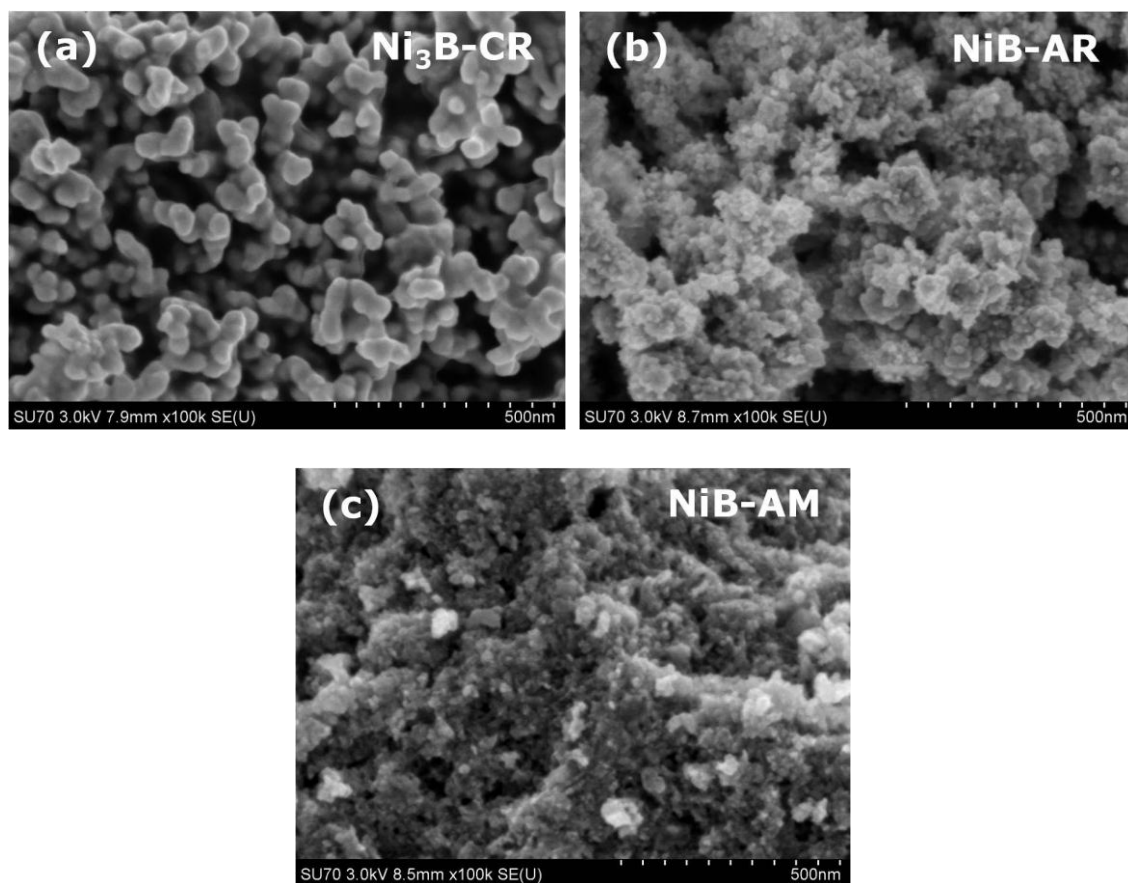*Department of Materials Science and Engineering, Zhejiang University, Hangzhou 310027, China*

Fig. S1 SEM images of as-prepared nanoparticles: (a) Ni$_3$B-CR, (b) NiB-AR, (c) NiB-AM.

[*] Corresponding author. Tel./fax: +86 571 8795 1152.
E-mail address: lxchen@zju.edu.cn (L.X. Chen).

Table S1 The composition of as-prepared Ni-B nanoparticles.

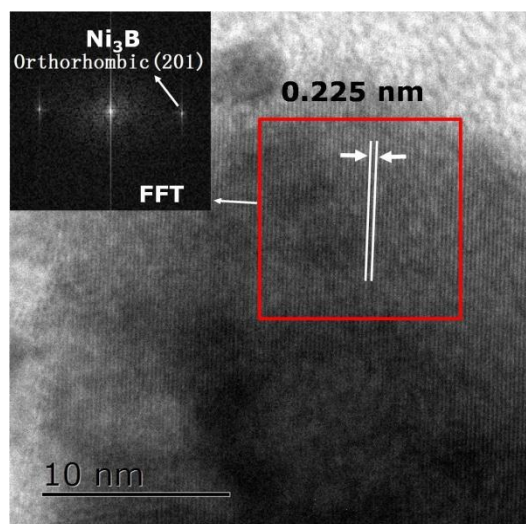| Sample	Ni (μg/mL)	B (μg/mL)	Composition (at %)
Ni$_3$B-CR	32.38	1.58	Ni$_{77.7}$B$_{22.3}$
NiB-AR	21.54	2.65	Ni$_{60.0}$B$_{40.0}$
NiB-AM	18.71	2.24	Ni$_{60.6}$B$_{39.4}$

Fig. S2 HRTEM Ni$_3$B-CR with inset digitalized fast Fourier transform (FFT) image.
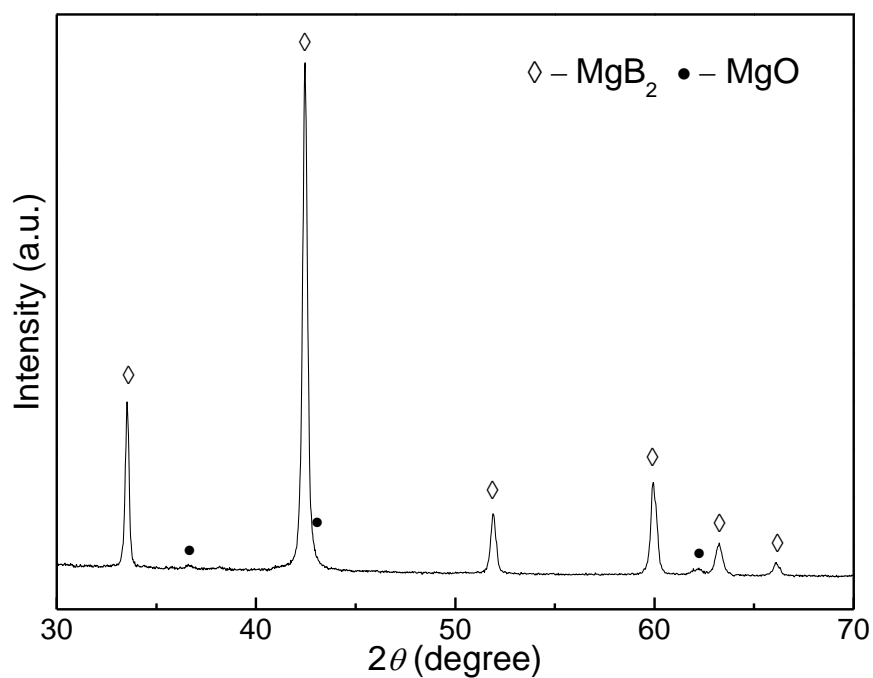

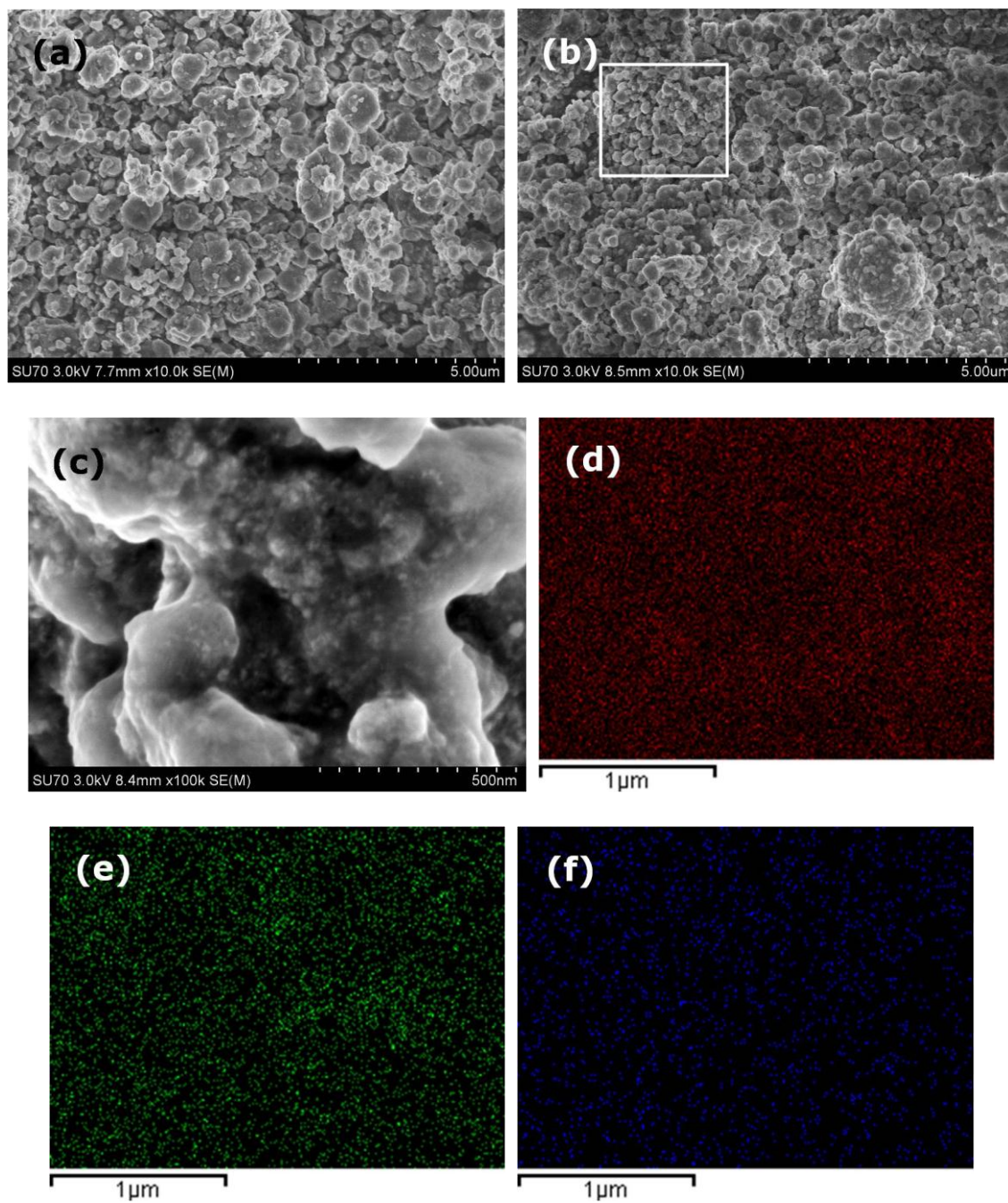**Fig. S3** XRD pattern of as-purchased MgB$_2$ from Alfa Aesar.

Fig. S4 SEM images for as-milled 2LiH-MgB$_2$ samples doped with 10 wt% additives: (a) blank, (b, c) NiB-AM. The white rectangle in (b) highlights the scanned region of the EDX elemental maps of (d) Mg, (e) Ni and (f) B.
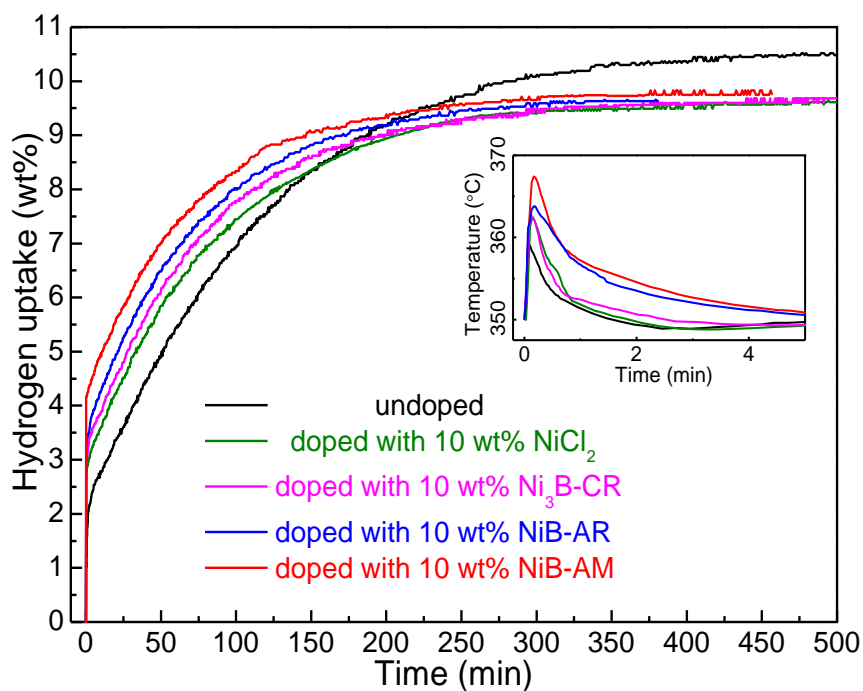
Fig. S5 Isothermal hydrogenation curves of the as-milled 2LiH-MgB$_2$ samples under 100 bar H$_2$ at 350 °C, the inset shows the sudden change in temperature at the beginning of hydrogenation.
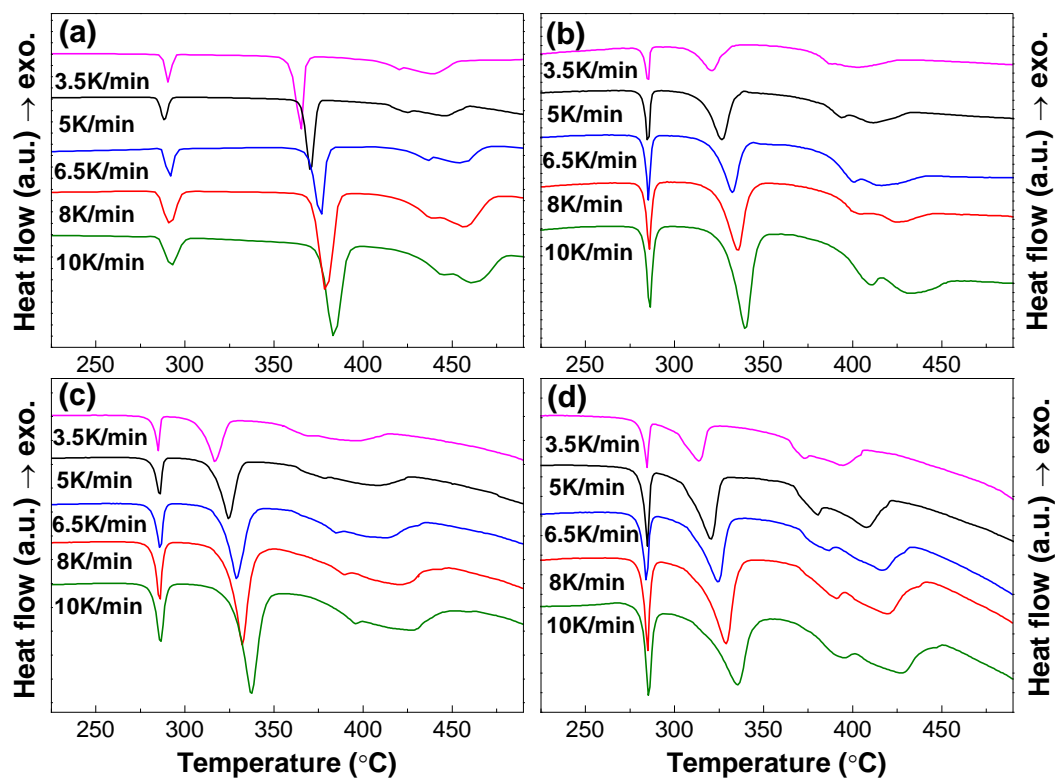

Fig. S6 DSC curves of the hydrogenated 2LiH-MgB$_2$ samples at various heating rates: (a) undoped, (b) doped with 10 wt% NiCl$_2$, (c) doped with 10 wt% Ni$_3$B-CR, (d) doped with 10 wt% NiB-AM.