Electronic Supplementary Information

In situ formed ultrafine NbTi nanocrystals from a NbTiC solid-solution MXene for hydrogen storage in MgH_2

Zeyi Wang,[‡a] Xuelian Zhang,[‡a] Zhuanghe Ren,[a] Yong Liu,[a] Jianjiang Hu,[b] Haiwen Li,[c] Mingxia Gao,[a] Hongge Pan,[a] Yongfeng Liu[a]*

[a]State Key Laboratory of Silicon Materials, Key Laboratory of Advanced Materials and Applications for Batteries of Zhejiang Province and School of Materials Science and Engineering, Zhejiang University, Hangzhou 310027, China. Tel/Fax: +86 571 87952615, E-mail: mselyf@zju.edu.cn

[b]Science and Technology on Aerospace Chemical Power Laboratory, Hubei Institute of Aerospace Chemotechnology, Xiangyang 441003, China

[c]Platform of Inter/Transdisciplinary Energy Research (Q-PIT), International Research Center for Hydrogen Energy, International Institute for Carbon-Neutral Energy Research (I2CNER), Kyushu University, 744 Motooka Nishi-ku Fukuoka 819-0395, Japan

‡ These authors contributed equally to this work.

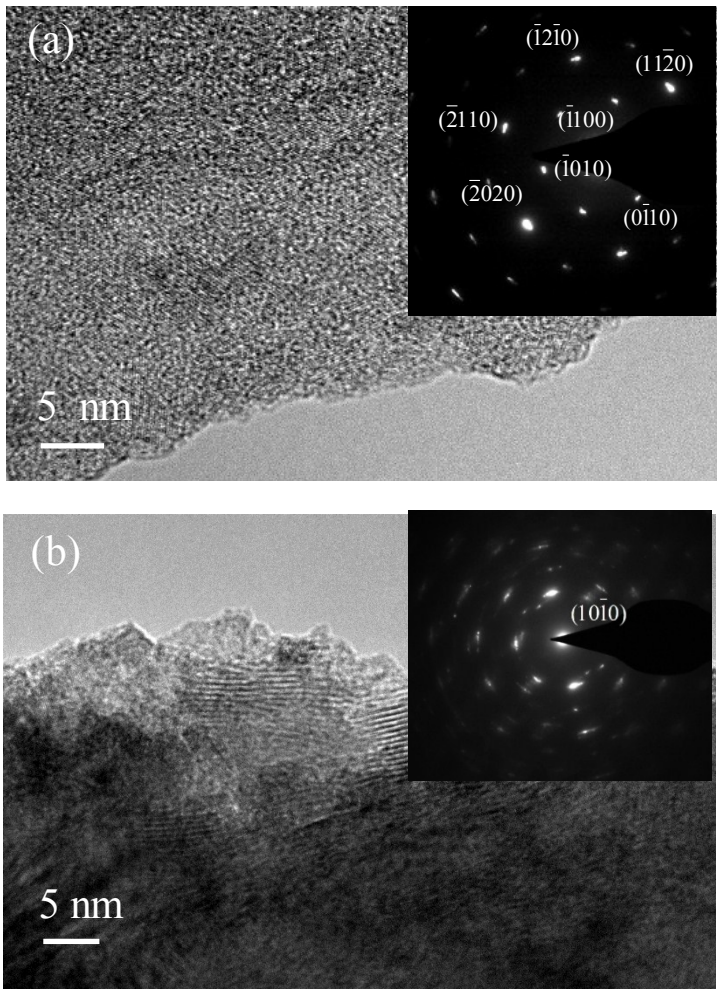

Fig. S1 TEM and SAED images of NbTiC (a) and NbTiAlC (b).

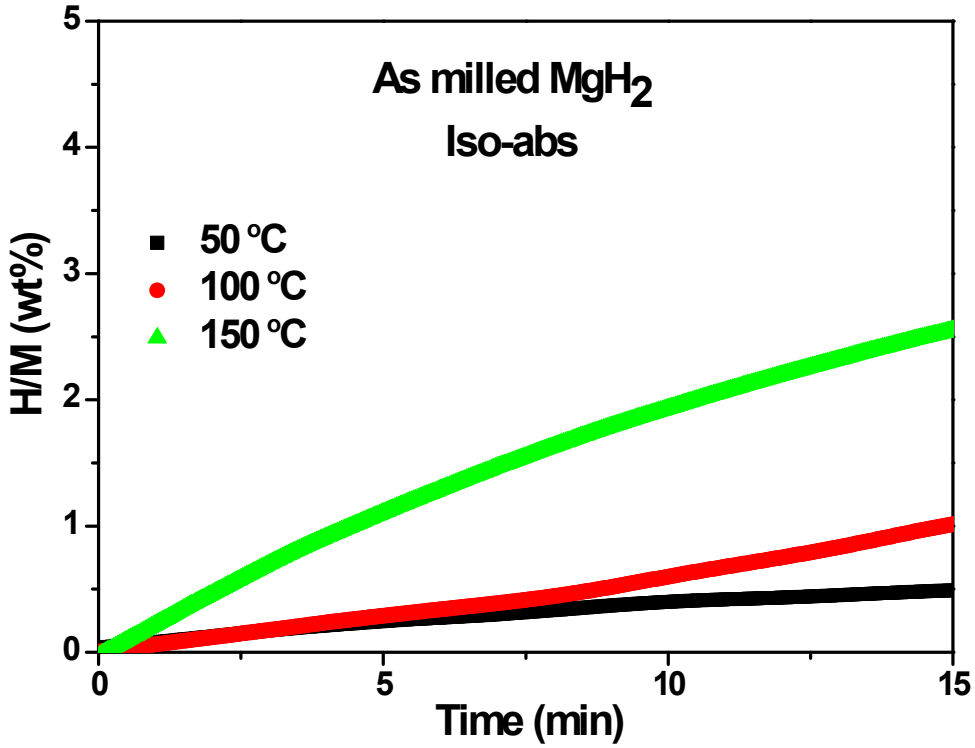

Fig. S2 Isothermal hydrogenation curves of the milled MgH_2.

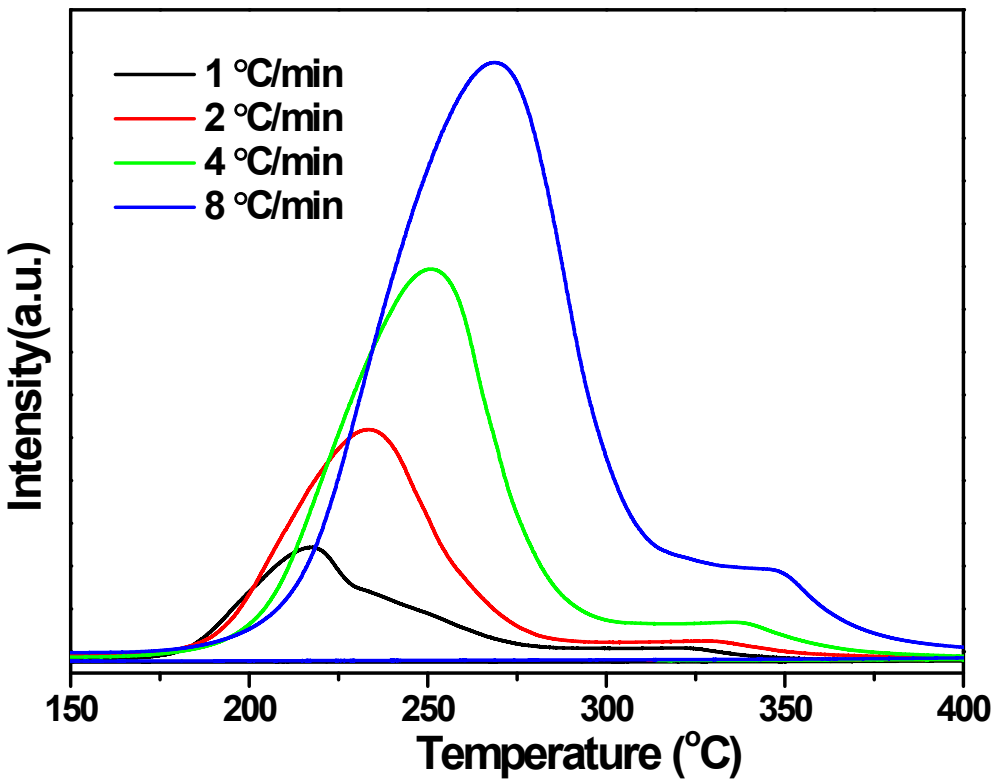

Fig. S3 TPD curves of MgH_2-9 wt% NbTiC at different heating rates.

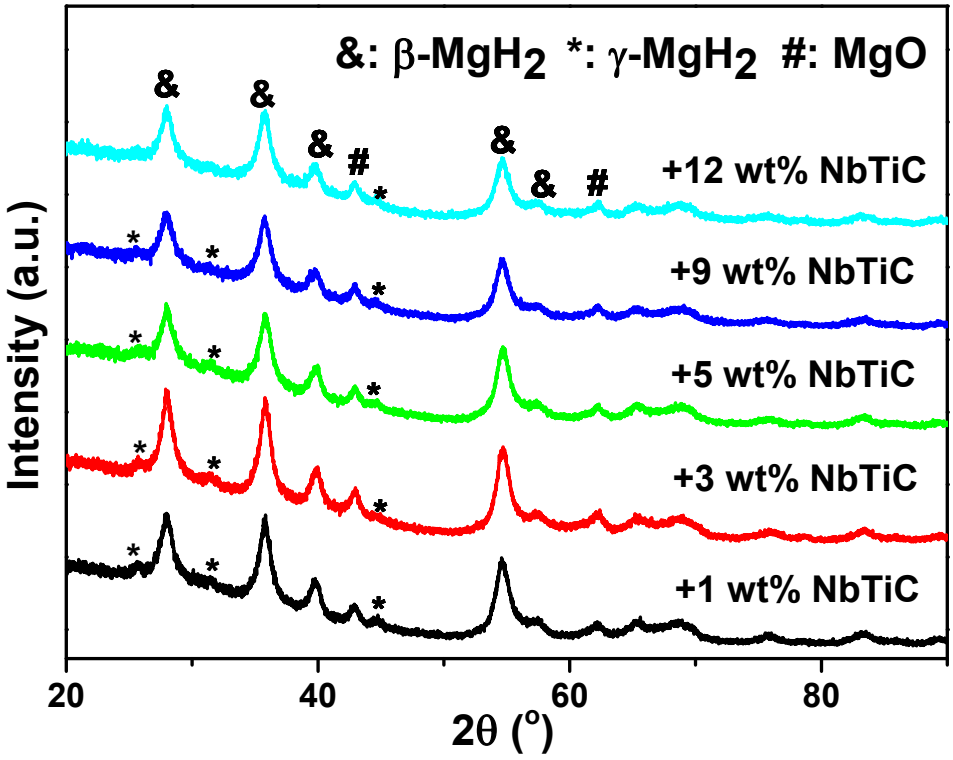

Fig. S4 XRD patterns of MgH_2-*x* wt% NbTiC samples.

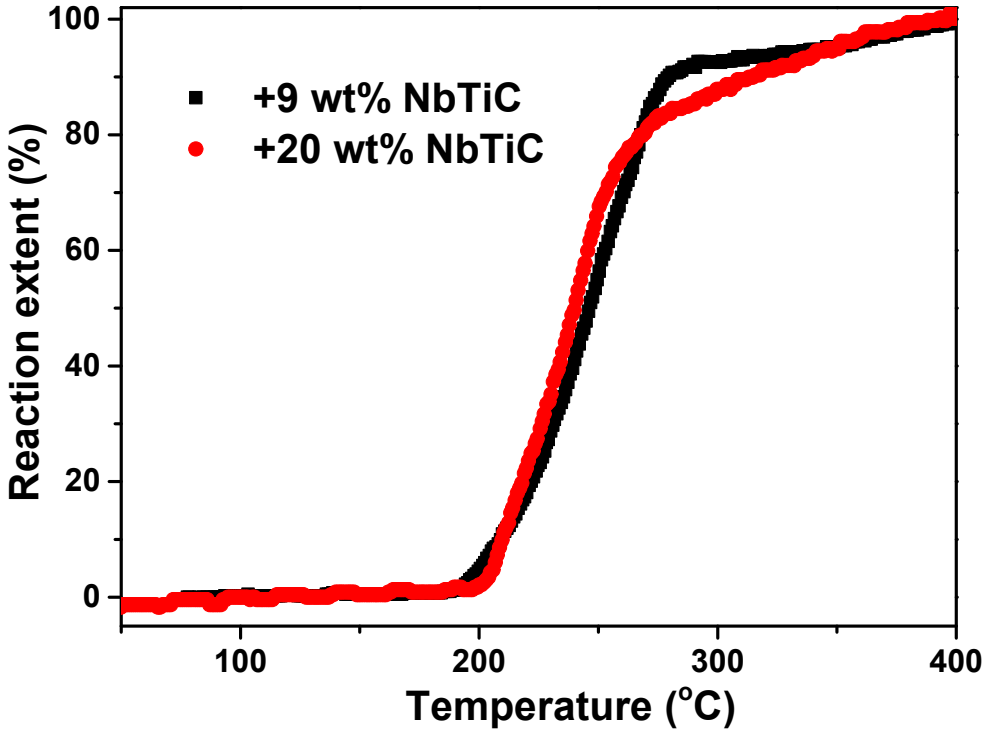

Fig. S5 Comparison of dehydrogenation curves of MgH_2 added with 9 wt% and 20 wt% NbTiC.

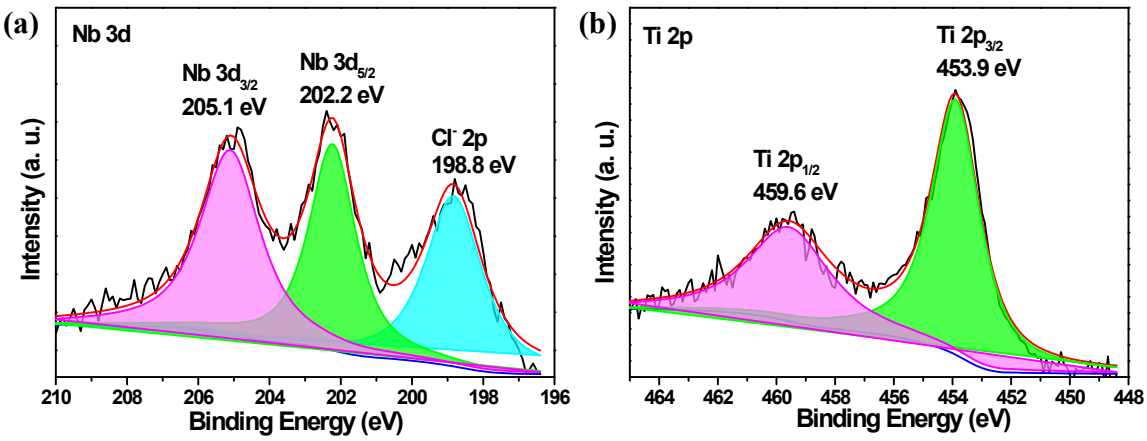

Fig. S6 XPS spectra of (a) Nd 3d of MgH_2-Nb_2C composite and (b) Ti 2p of MgH_2-Ti_2C.

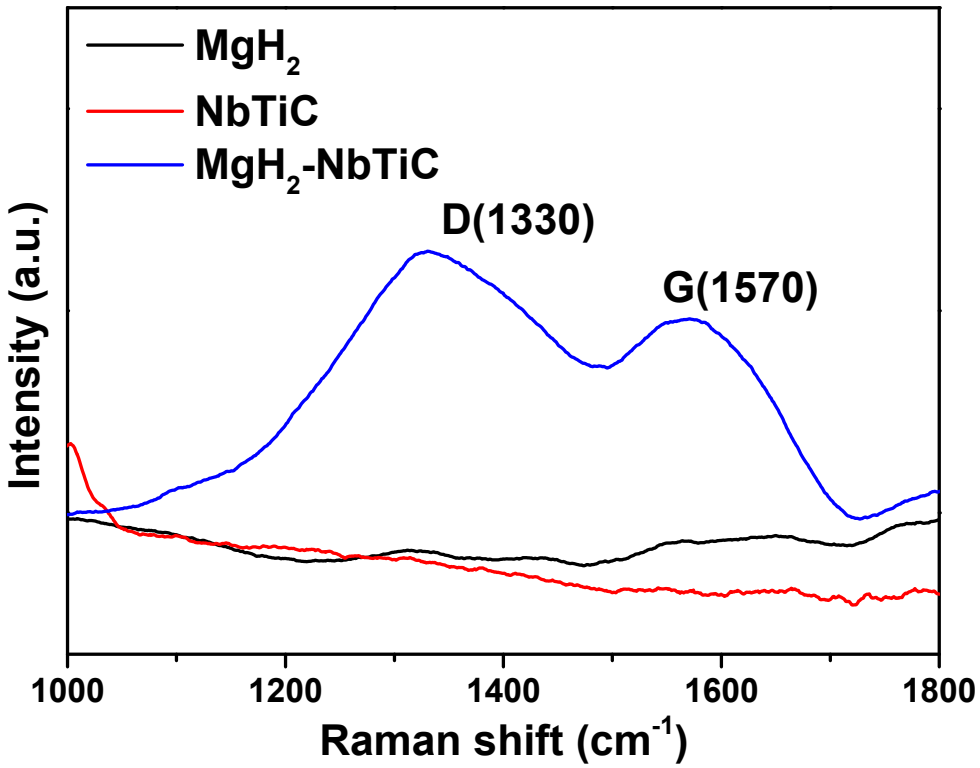

Fig. S7 Raman spectra of pristine MgH_2, NbTiC and MgH_2-NbTiC composite.