Enhanced hydrogen storage properties of MgH₂ with numerous hydrogen diffusion channels provided by Na₂Ti₃O₇ nanotubes

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Fig. S1 XRD patterns for (a) dehydrogenated and (b) rehydrogenated MgH₂-Na₂Ti₃O₇ NRs composite.

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Fig. S2 SEM photograph of bulk MgH$_2$.\textsuperscript{1}
Bulk Na$_2$Ti$_3$O$_7$ was synthesized via a reported method$^2$ and then introduced to MgH$_2$ to see the catalytic effect of bulk Na$_2$Ti$_3$O$_7$. The bulk Na$_2$Ti$_3$O$_7$ can also catalyzing the hydrogen desorption of MgH$_2$. After modified by bulk Na$_2$Ti$_3$O$_7$, the MgH$_2$-Na$_2$Ti$_3$O$_7$ composite could release about 5 wt% hydrogen in 250 minutes at 300 ºC (Fig. 1), while bulk MgH$_2$ could hardly release any hydrogen at the same experimental condition. However, the desorption kinetics of MgH$_2$-Na$_2$Ti$_3$O$_7$ composite is much slower compared with that of MgH$_2$-Na$_2$Ti$_3$O$_7$ NRs and MgH$_2$-...
Na$_2$Ti$_3$O$_7$ NTs, which could release 6.5 wt% H$_2$ within 16 min and 6 min, respectively.

Fig. S4 Isothermal desorption curves of MgH$_2$-Na$_2$Ti$_3$O$_7$ under 3 kPa hydrogen back pressure at 300 °C.

References
