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Supplementary Material

Improved hydrogen storage properties of MgH_2 by the addition of FeS_2 micro-spheres

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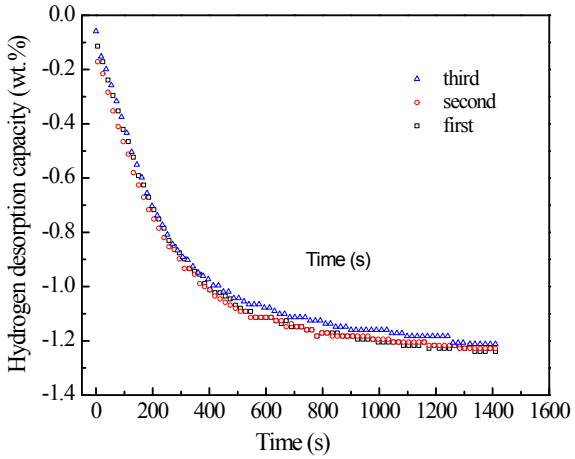

Fig. S1 Isothermal cyclic desorption curves of as-milled MgH_2–16.7 wt.% FeS_2 composite at 573 K under 0.01 MPa H_2.

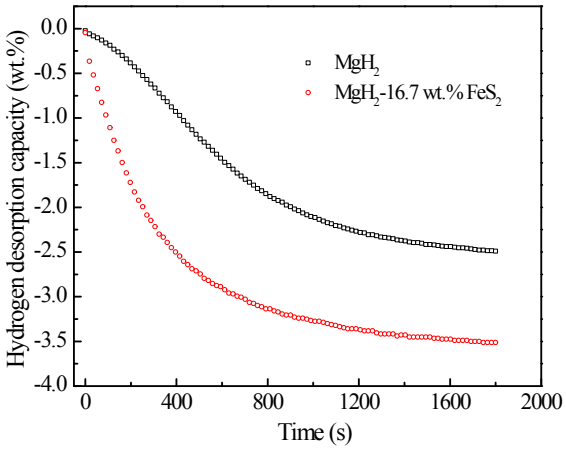

Fig. S2 Isothermal desorption curves of as-milled pure MgH_2 and MgH_2–16.7 wt.% FeS_2 composite at 623 K under 0.01 MPa H_2.

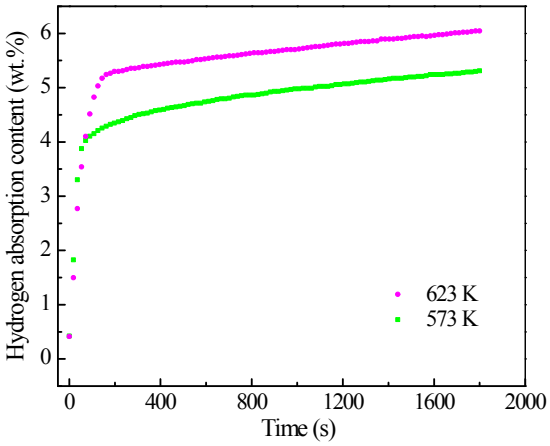

Fig. S3 Isothermal absorption curves of the MgH_2–16.7 wt.% FeS_2 composite at 573 K and 623 K under 3 MPa H_2.

Table S1. Comparison of the hydrogen storage properties of MgH_2 with the addition of different iron-based catalytic additives.

additives	T_{onset} (K)	Desorption kinetics	Absorption kinetics	E_a (kJ/mol)	Ref.
2 mol.% Fe_2O_3	-	598 K 5.45 wt.%	598 K 5.80 wt.%	-	1
5 wt.% Fe_3O_4	558	563 K 5.50 wt.%	563 K 4.50 wt.%	-	2
10 wt.% $FeCl_3$	523	573 K 5.75 wt.%	573 K 5.21 wt.%	130	3
10 wt.% FeF_3	-	573 K 5.92 wt.%	473 K 4.03 wt.%	77.6	4
7 mol.% $MnFe_2O_4$	573	573 K 5.05 wt.%	-	64.55	5
10 wt.% Na_3FeF_6	523	573 K 4.30 wt.%	593 K 4.40 wt.%	75	6
16.7 wt.% FeS_2	569	573 K 1.24 wt.%	423 K 3.71 wt.%	68.94	this work

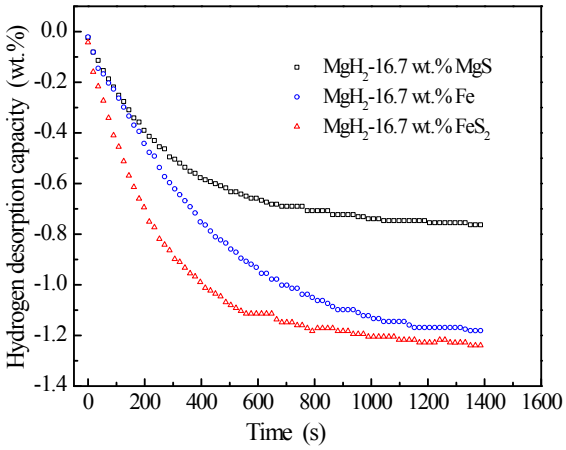

Fig. S4 Isothermal desorption curves of as-milled MgH_2 with 16.7 wt.% MgS, Fe and FeS_2 composites at 573 K under 0.01 MPa H_2.

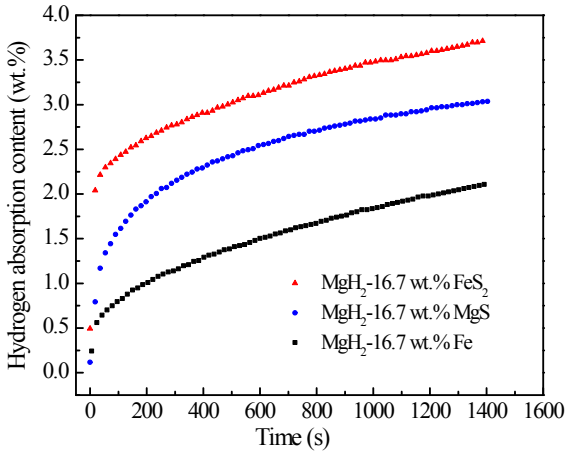

Fig. S5 Isothermal absorption curves of as-milled MgH_2 with 16.7 wt.% Fe, MgS and FeS_2 composites at 423 K under 3 MPa H_2.

Reference

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