Supplementary Information

Simultaneous improvement of kinetics and thermodynamics based on SrF_2 and SrF_2@Gr additives on hydrogen sorption in MgH_2

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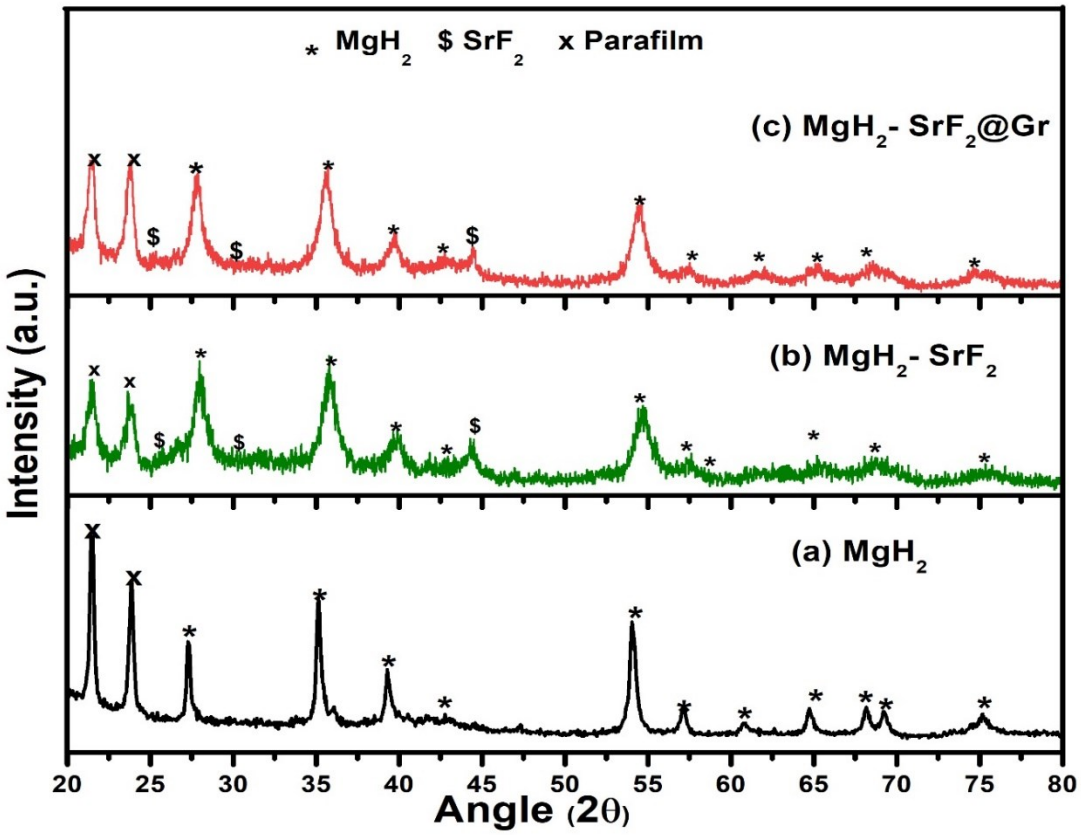


Figure.S1 XRD of (a) MgH_2 (b) MgH_2-SrF_2 (c) MgH_2- SrF_2@Gr.

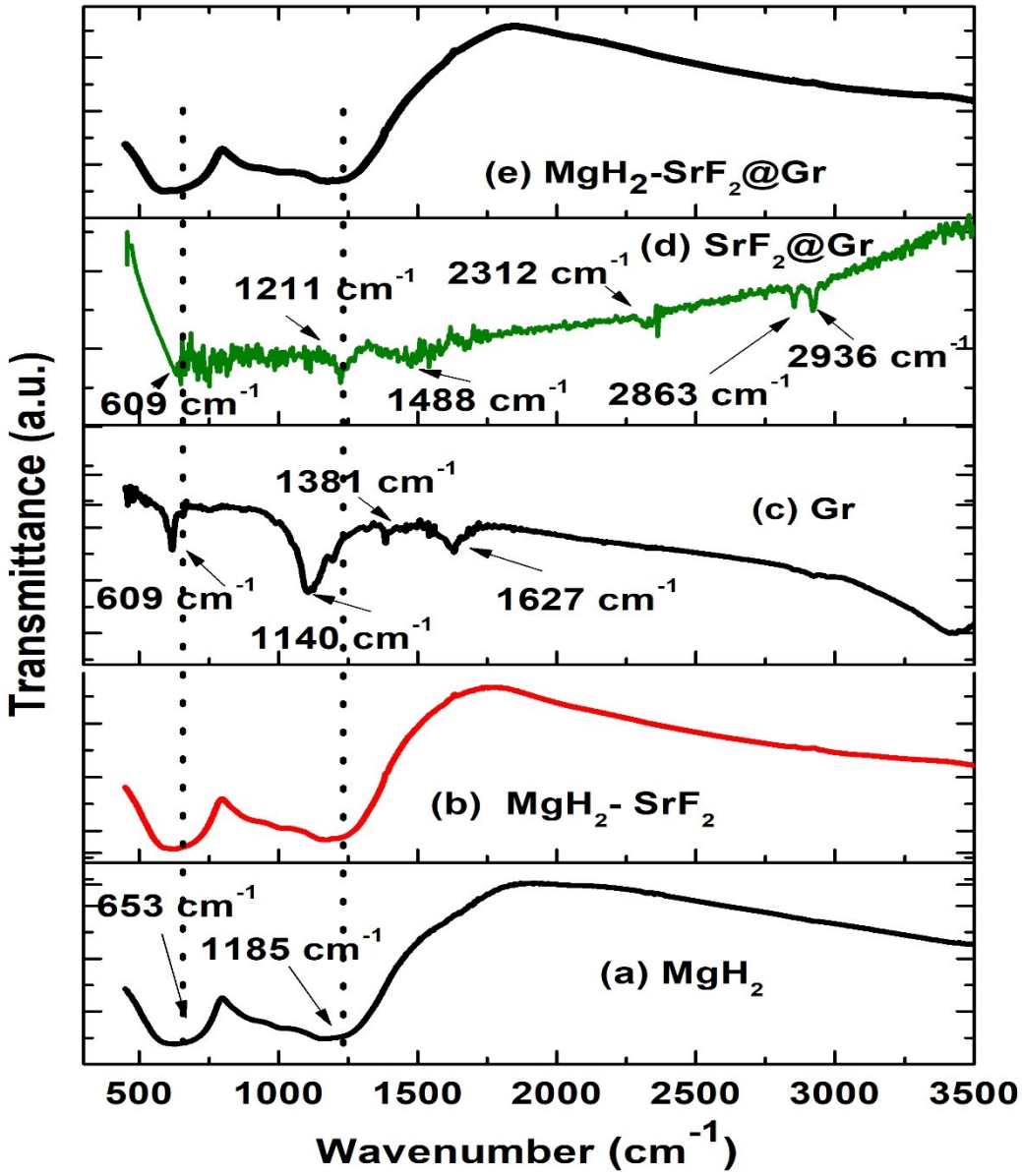


Figure.S2 FTIR spectra of MgH_2 added (a) MgH_2 (b) MgH_2-SrF_2 (c) Gr (d) SrF_2@Gr (e) MgH_2-SrF_2@Gr.

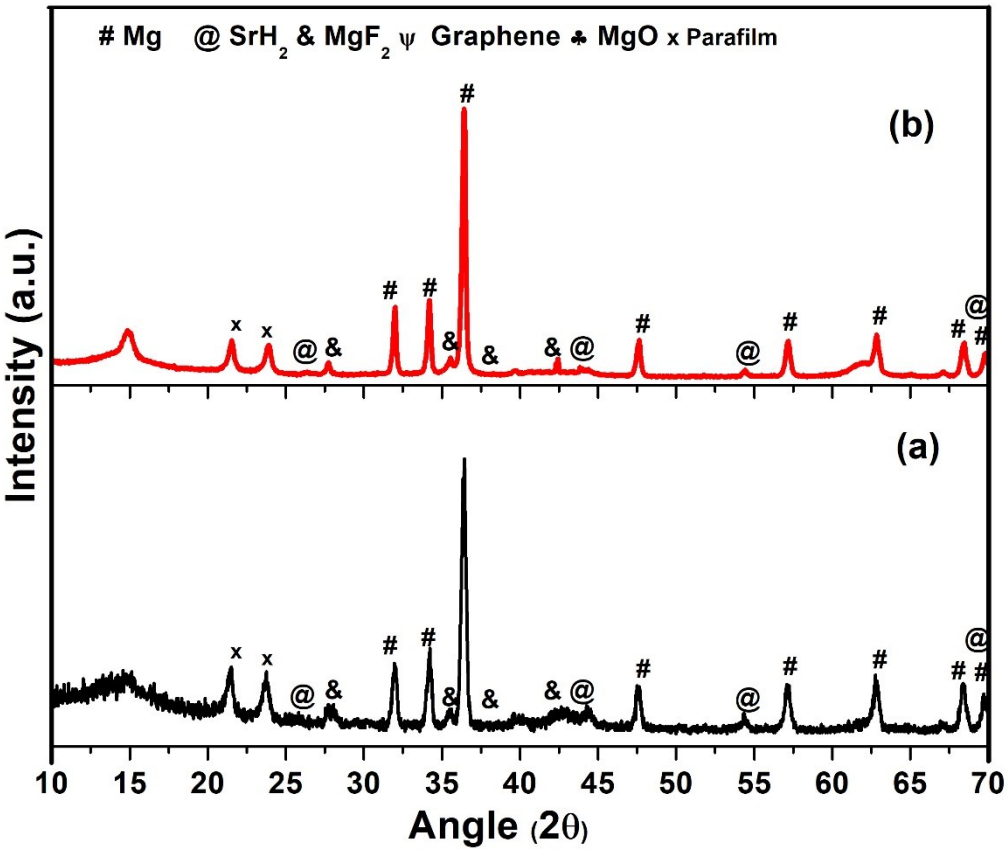
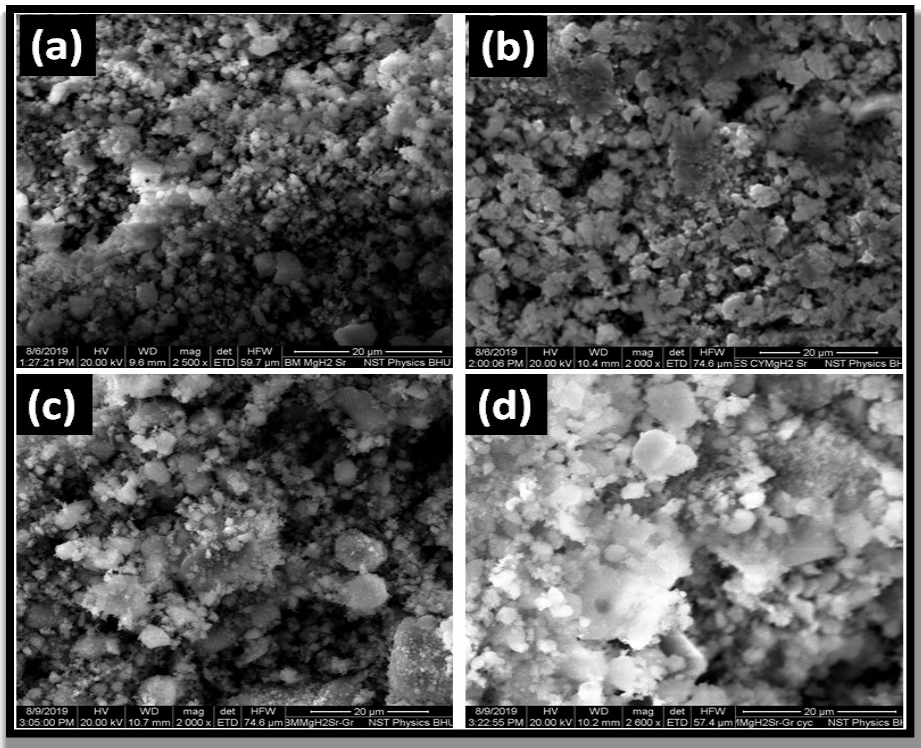


Figure S3 XRD of (a) Mg-(MgF_2+SrH_2) (1st dehydrogenation) (b) Mg-SrF_2@Gr (1st dehydrogenation)



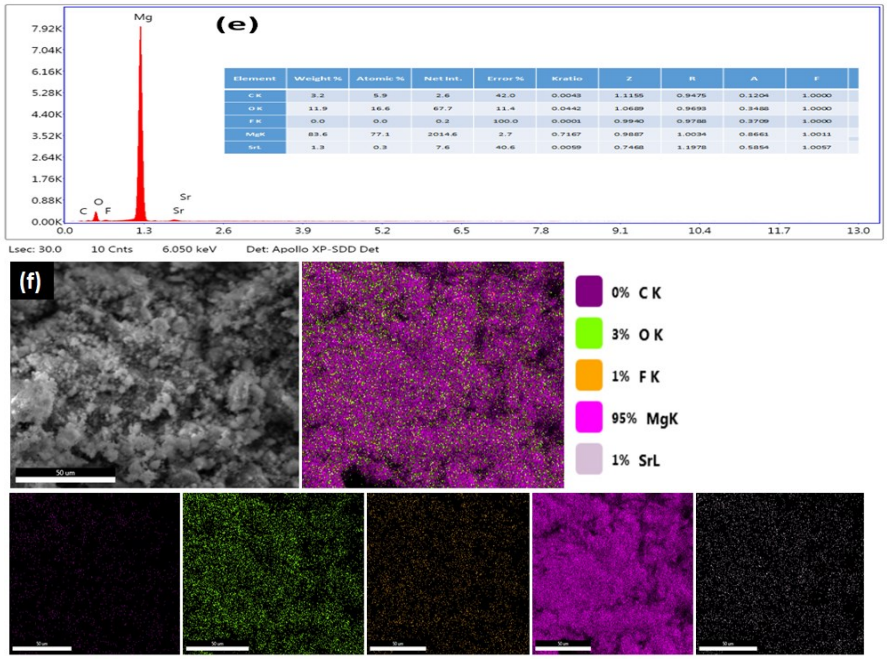


Figure S4 Scanning electron micrographs of (a) MgH_2-SrF_2 (b) 1 st desorption of MgH_2-SrF_2 (Mg-(MgF_2+SrH_2)@Gr) (c) MgH_2-SrF_2@Gr (d) After cycling of MgH_2-SrF_2@Gr (MgH_2-(MgF_2+SrH_2)@Gr) (e) EDAX spectra after cycling of MgH_2-(MgF_2+SrH_2)@Gr sample (f) Elemental mapping after cycling of MgH_2-(MgF_2+SrH_2)@Gr

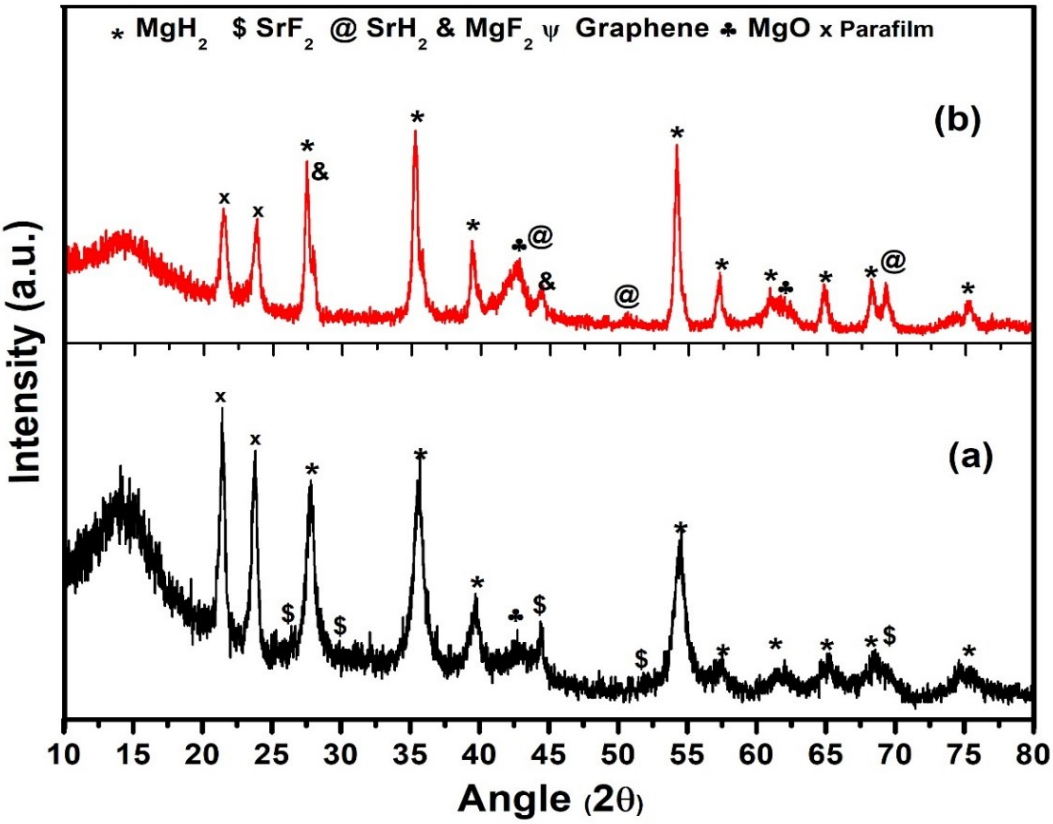


Figure S5 XRD of (a) MgH_2-SrF_2@Gr (b) After 15th absorption of Mg/MgH_2-(MgF_2+SrH_2)@Gr.

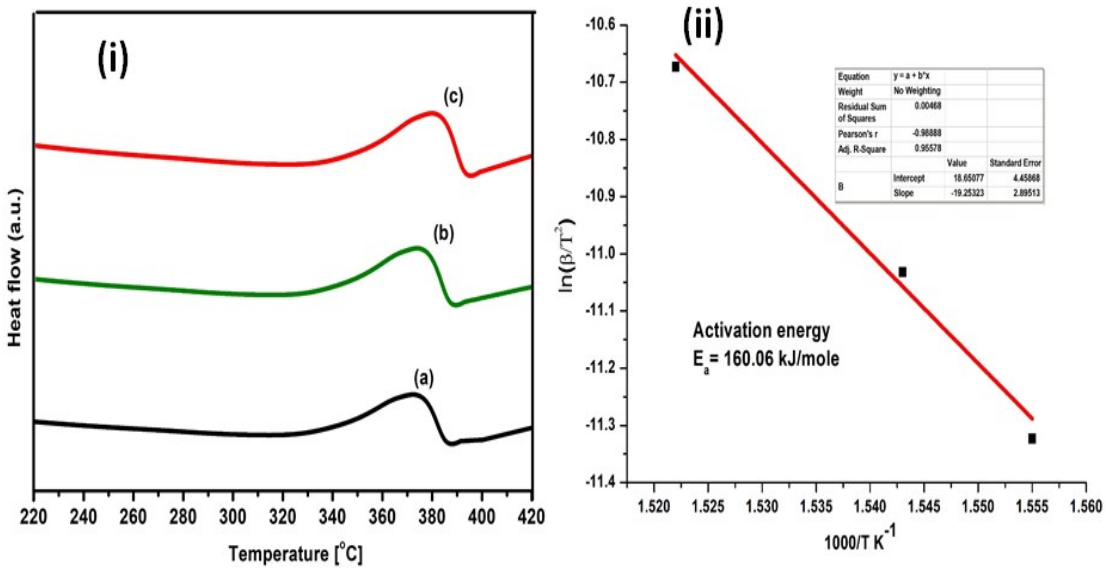


Figure S6 DSC plot of ball milled MgH_2 for 25 hrs at different heating rates (a) 5°C/min (b) 7°C/min (c) 10°C/min (ii) Kissinger plot for the calculation of activation energy.

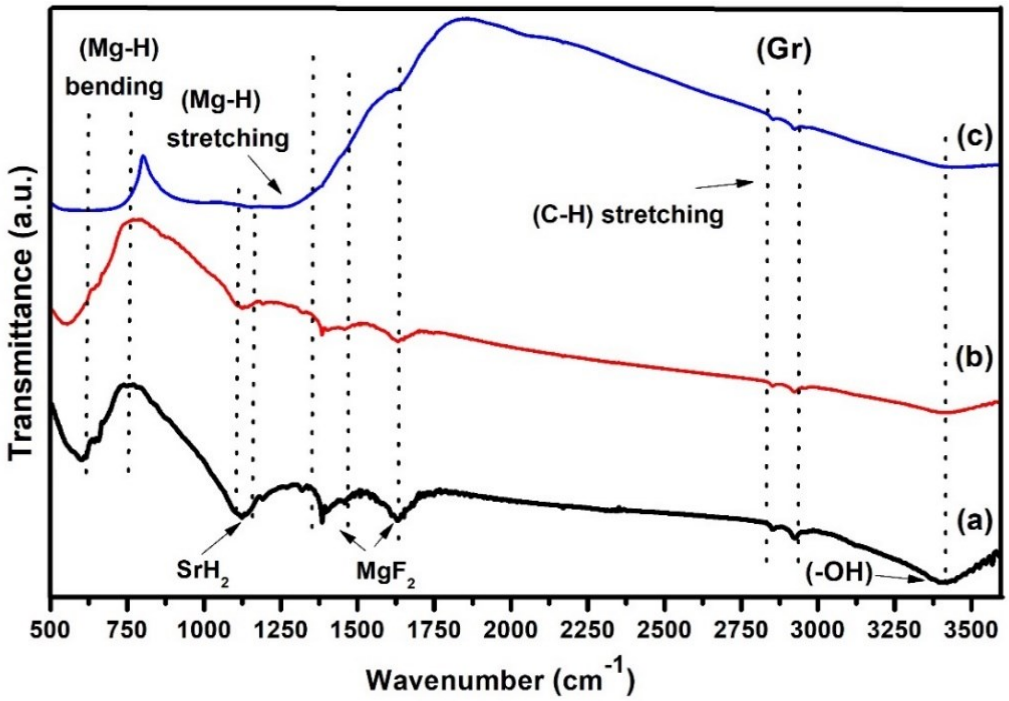


Figure S7 FTIR of (a) Mg-(SrH_2-MgF_2)@Gr (Ist dehydrogenation) (b) Mg-(SrH_2-MgF_2)@Gr (After 14 cycle of dehydrogenation) (c) MgH_2-(SrH_2-MgF_2)@Gr (After 15 cycle of rehydrogenation).