Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Appendix A. Supplementary data

CO_2 green technologies in CO_2 capture and direct utilization process: Methanation, reverse water-gas shift, and dry reforming of methane

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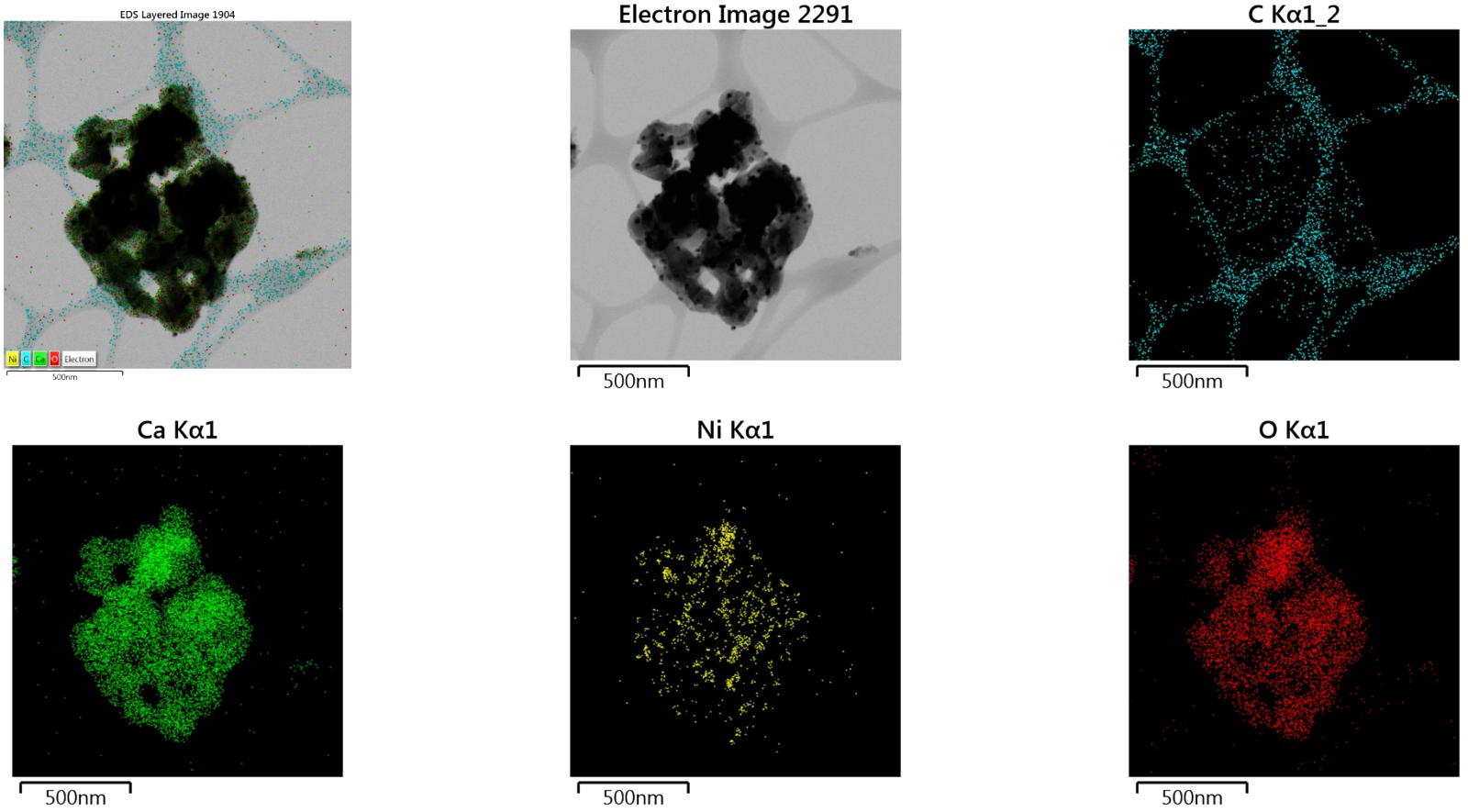

Fig. S1 TEM-Mapping of the Ni/CaO catal-sorbents

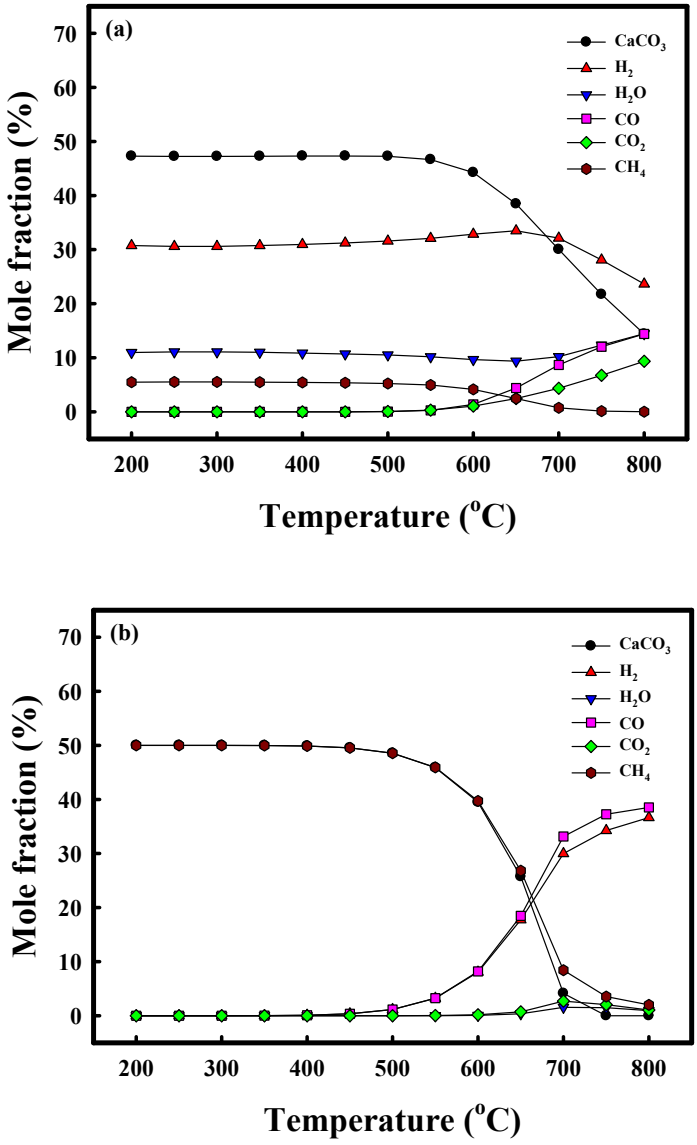

Fig. S2 Thermodynamics equilibrium mole fraction of $CaCO_3$ conversion with (a) H_2 ($H_2/CaCO_3$ ratio of 1) and (b) CH_4 ($CH_4/CaCO_3$ ratio of 1) as a function of reaction temperature.

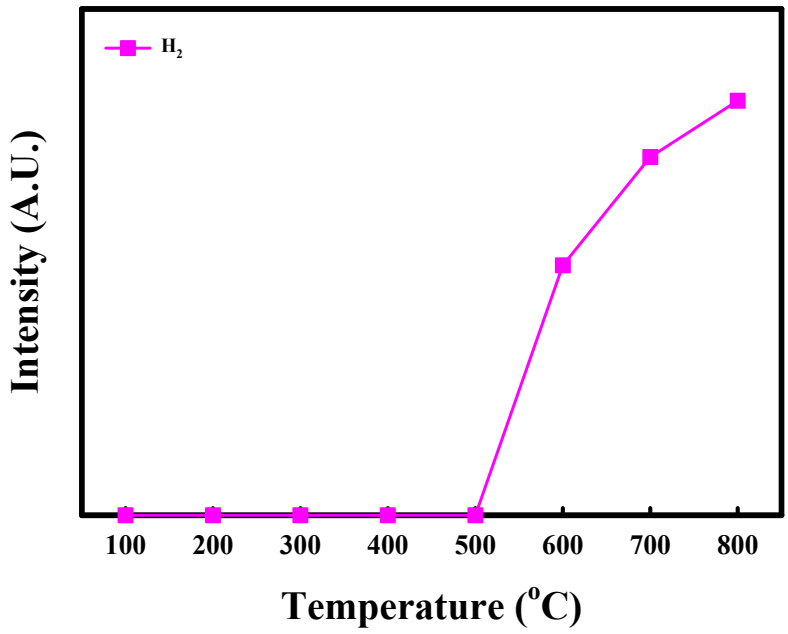

Fig. S3 TPD result of Ni/CaO catal-sorbent after carbonation under CH_4 conditions from 100 °C to 800 °C.

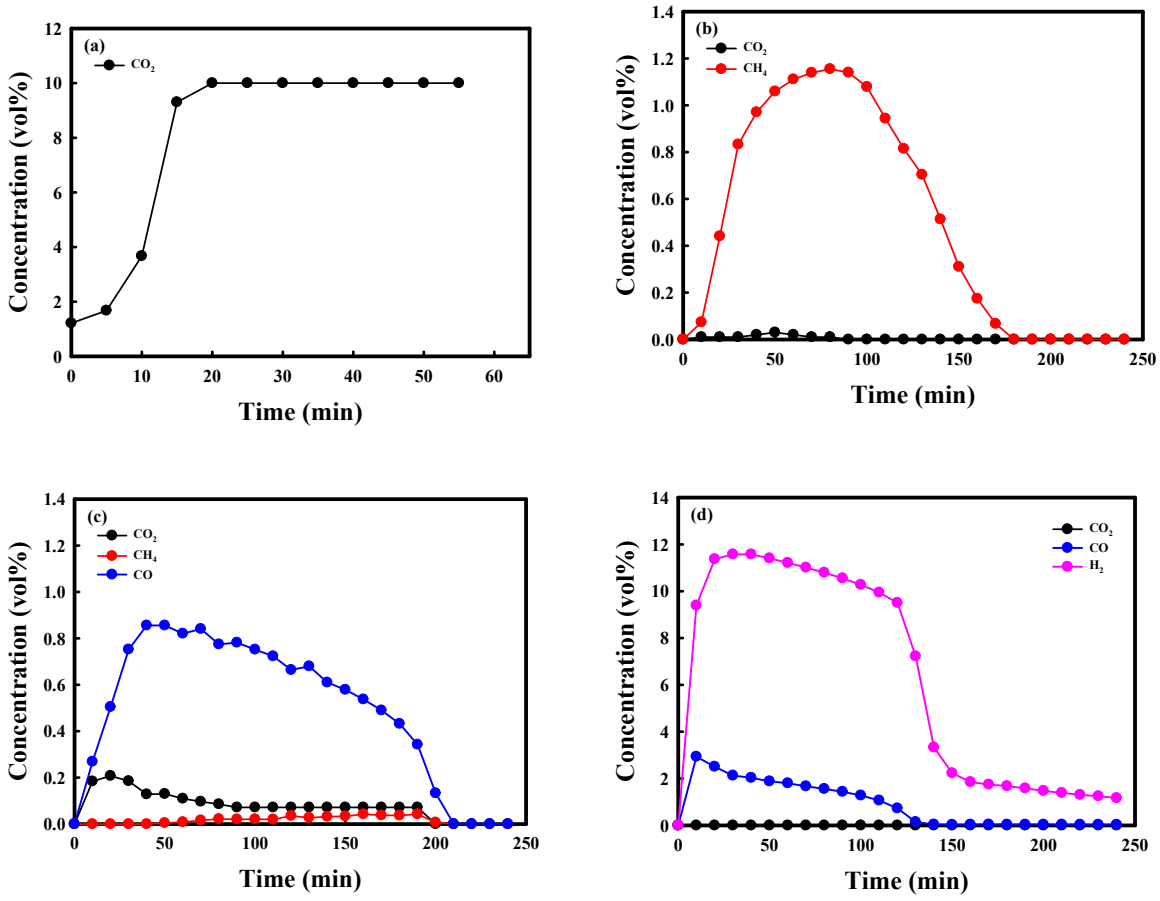

Fig. S4 CO_2 green technologies in CO_2 capture and direct utilization: (a) CO_2 capture, (b) direct methanation, (c) direct rWGS, and (d) direct DRM over the Ni/CaO catal-sorbent