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

Supporting Information

High-purity H_2 production by sorption-enhanced water gas shift on a K_2CO_3-promoted Cu/MgO-Al_2O_3 difunctional material

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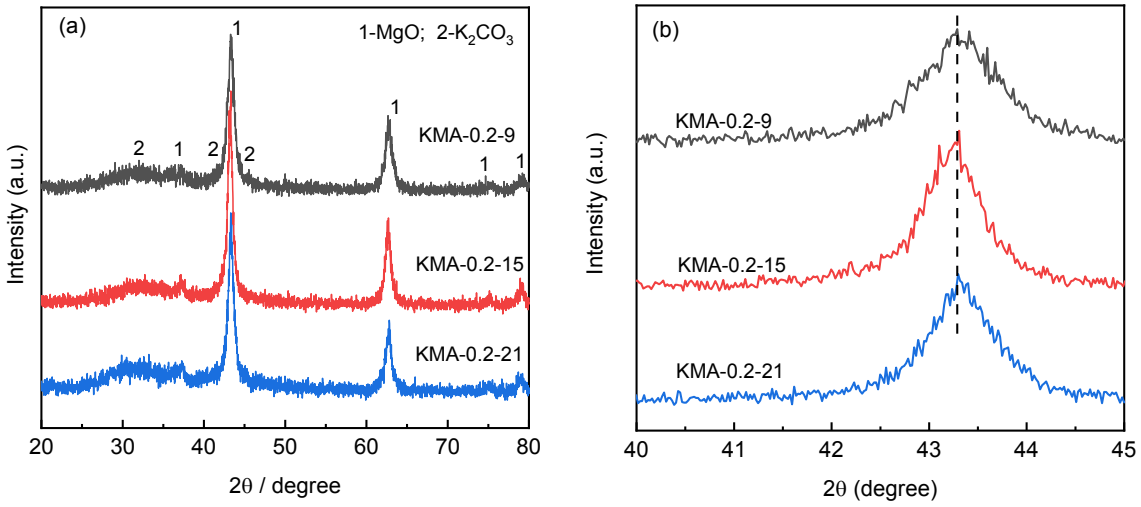

Fig. S1. XRD patterns of KMA-0.2-y at 2θ degrees of (a) 20-80º and (b) 40-45º.

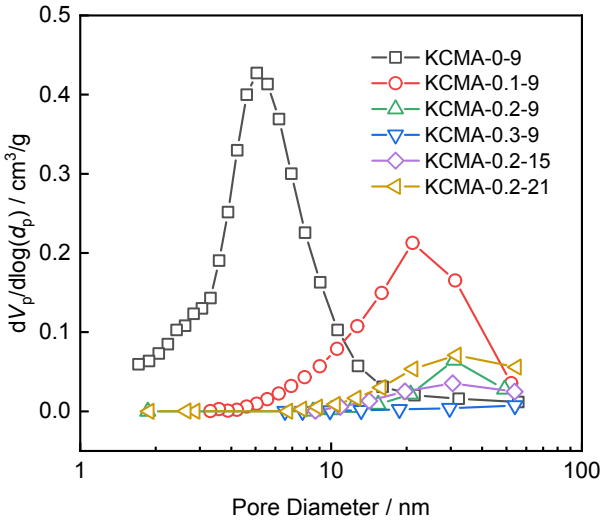

Fig. S2. Pore size distribution curves of KCMA-x-y.

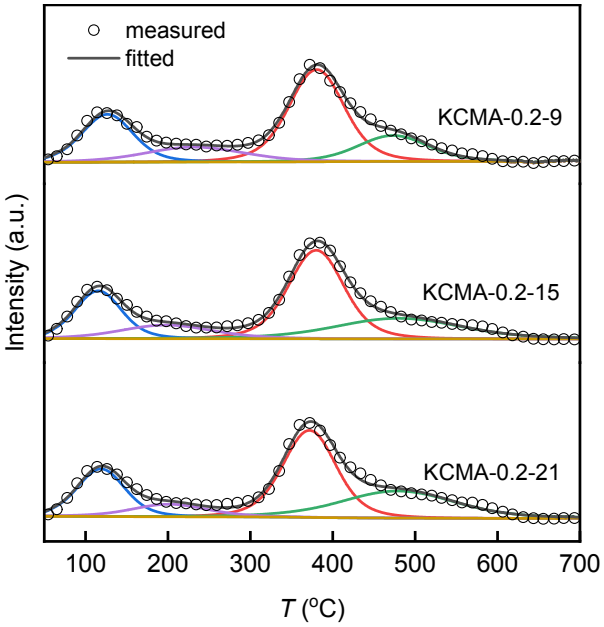

Fig. S3. CO_2-TPD patterns of KCMA-0.2-y.

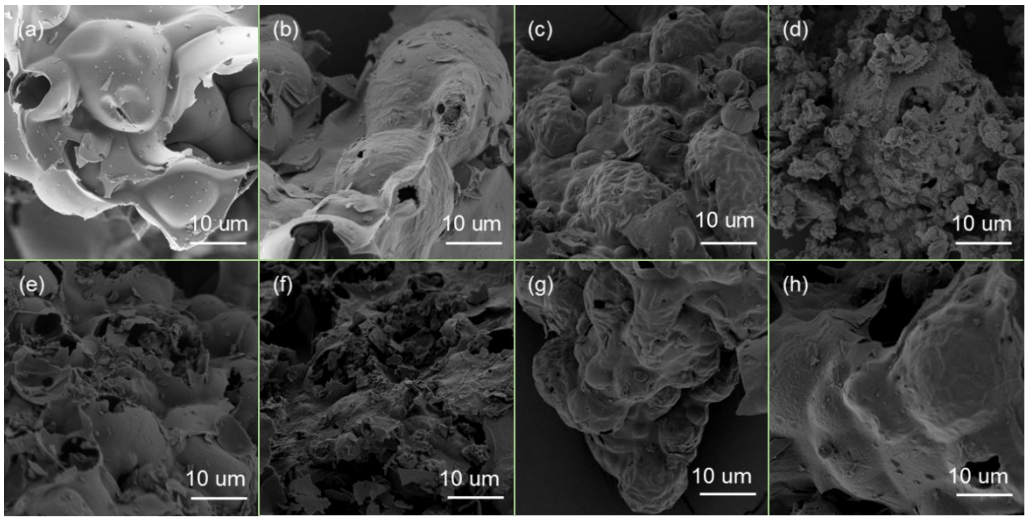

Fig. S4. FESEM images of (a) KCMA-0-9, (b) KCMA-0.1-9, (c) KCMA-0.2-9, (d) KCMA-0.3-9, (e) KCMA-0.2-15, (f) KCMA-0.2-21, (g) KCMA-0.2-9(300) and (h) KCMA-0.2-9(420) after 10 adsorption- desorption cycles.

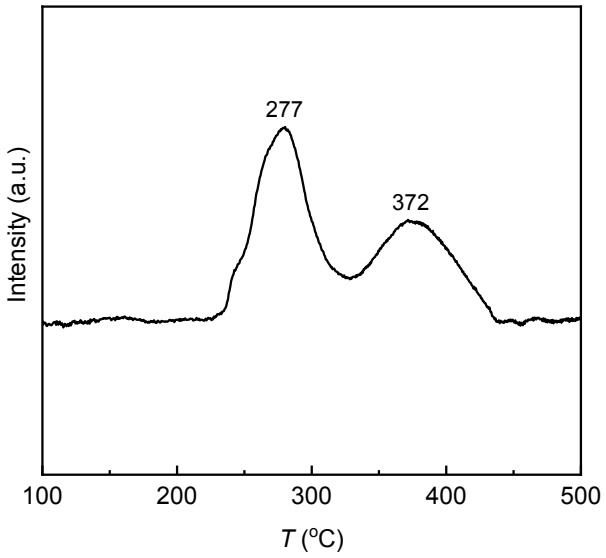

Fig. S5. H_2-TPR profile of KCMA-0.2-9.

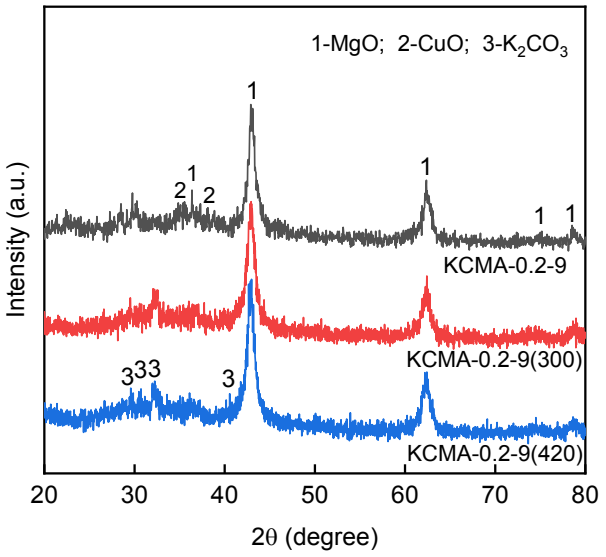

Fig. S6. XRD patterns of KCMA-0.2-9, KCMA-0.2-9(300) and KCMA-0.2-9(420).

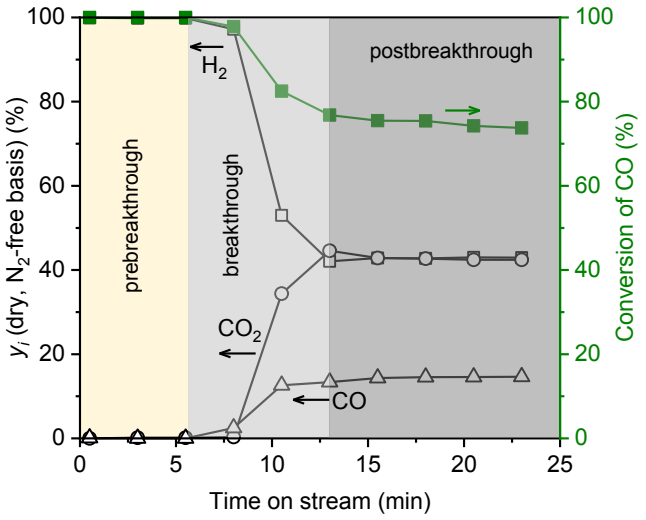

Fig. S7. CO conversion and product gas composition (y_i, dry and N_2-free basis) over KCMA-0.2-9(420) at the first SEWGS cycle.

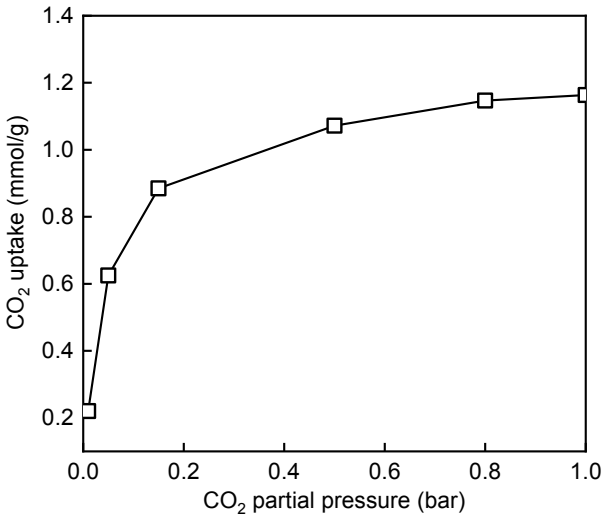

Fig. S8. CO_2 uptake of KCMA-0.2-9 at different CO_2 partial pressures.

(Note: when 1% CO_2/N_2 was used as feedstock, the CO_2 uptake was measured by a Vaisala GMP252 CO_2 probe, as mentioned in the text. In other cases (5%, 15%, 50%, 80% and 100% of CO_2), the CO_2 uptake was measured using a thermogravimetric analyzer (TGA, WRT-3P, Shanghai Precision & Scientific Instrument Co., Ltd.).)