

Supplementary Information for

Use of monolithic silicon carbide aerogel as a reusable support for development of regenerable CO₂ adsorbent

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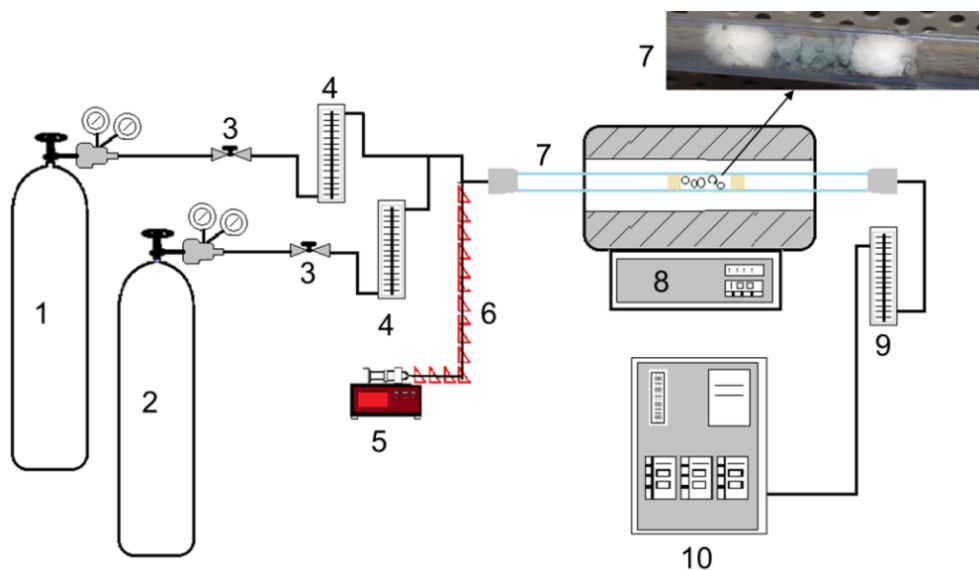


Fig. S1 CO₂ capture setup: (1) N₂ cylinder; (2) N₂+CO₂ mixture gas cylinder; (3) valves; (4) flow meter (FM-1050, Matheson Tri-gas Inc.); (5) syringe pump (NE-300 Just Infusion, New Era Pump Systems); (6) heat tap with a controller (MiniTrol, Glas-Col Inc); (7) circular glass tube reactor (9 × 610 mm); (8) tube furnace (MTI GSL-1100X); (9) flow meter for gas leakage and back pressure checking (FM-1050, Matheson Tri-gas Inc.); (10) gas analyzer with data recorder [ZSU-BY3000, Fuji Electric (China) Co. Ltd.].

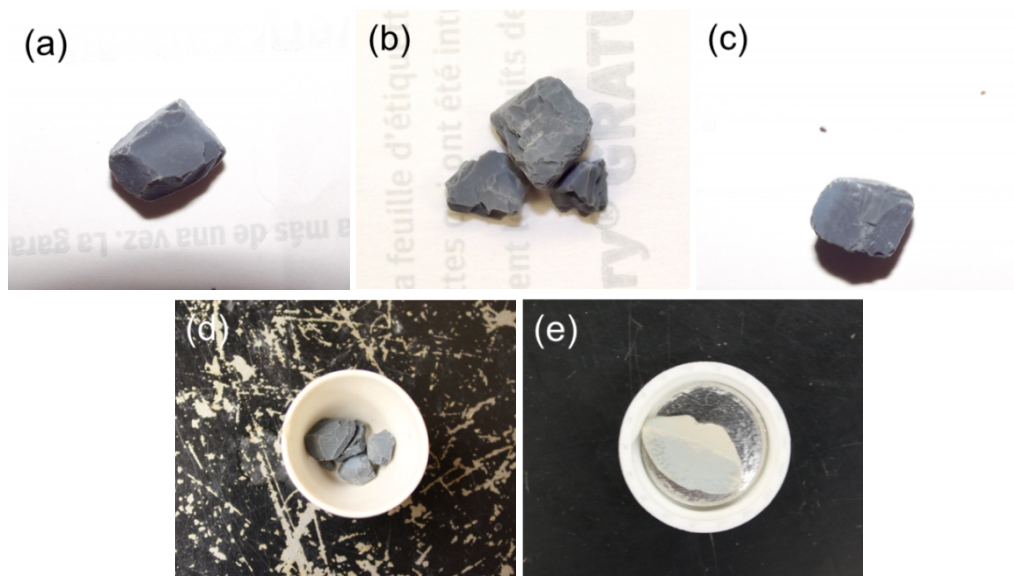


Fig. S2 Photos of (a) MSiCA, (b) AFMSiCA, (c) RF-MSiCA-6 (d) RF-MSiCA-12 and (e) RF-MSiCA-18.

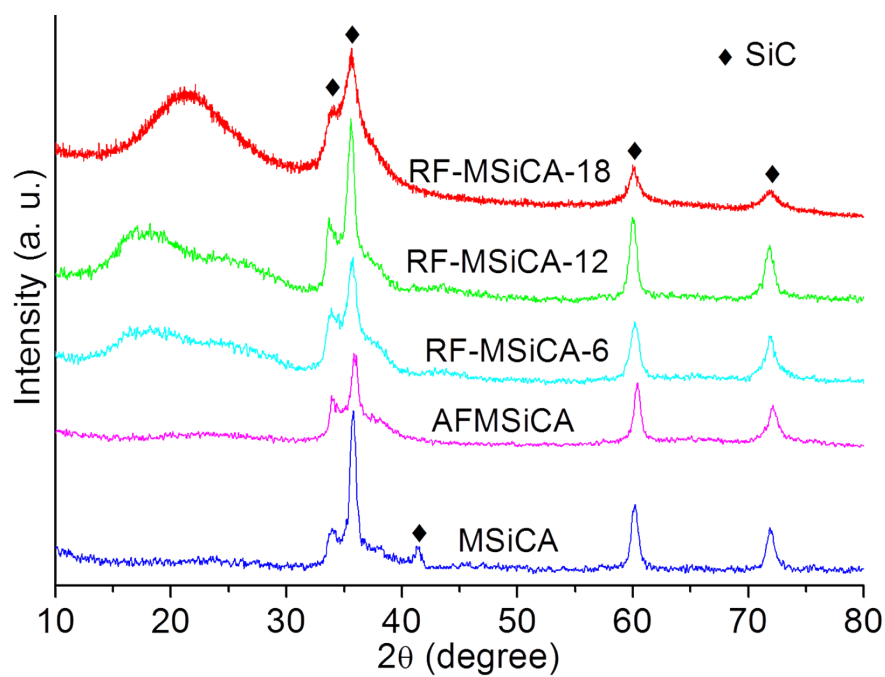


Fig. S3 XRD patterns of MSiCA, AFMSiCA and RF-MSiCA-x.

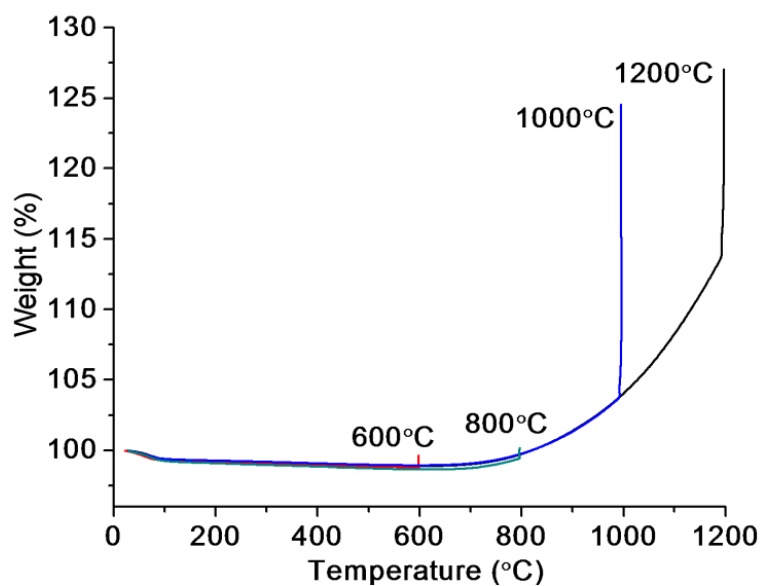


Fig. S4 TG curves of MSiCA (air flow of 30 ml/min, heating rate of 20 °C/min, the final temperatures were held for 2 h).

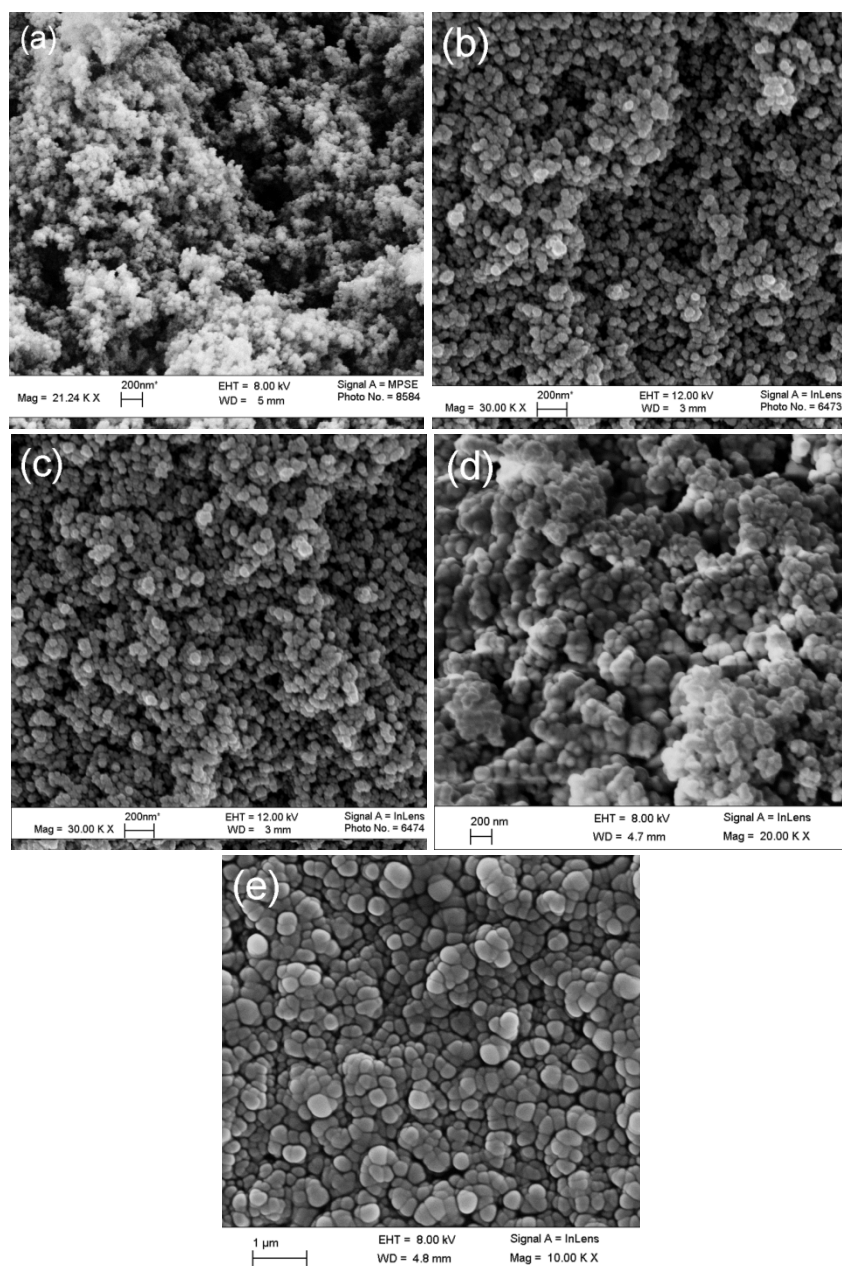


Fig. S5 SEM images of (a) MSiCA, (b) AFMSiCA, (c) RF-MSiCA-6, (d) RF-MSiCA-12 and (e) RF-MSiCA-18.

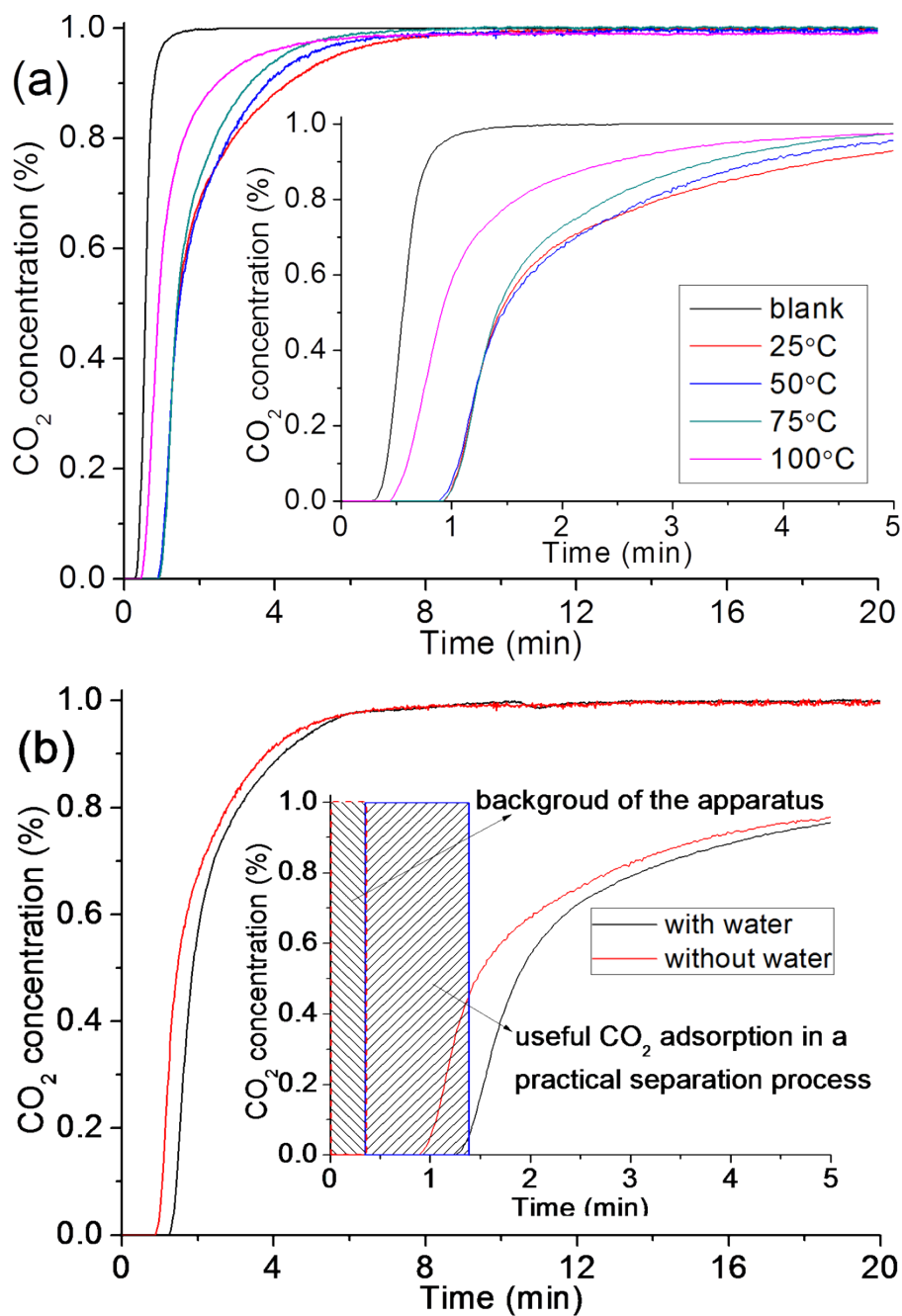


Fig. S6 (a) CO₂ adsorption profiles of AFMSiCA at different temperatures in the absence of water; (b) CO₂ adsorption profiles of AFMSiCA at 50 °C with and without water.

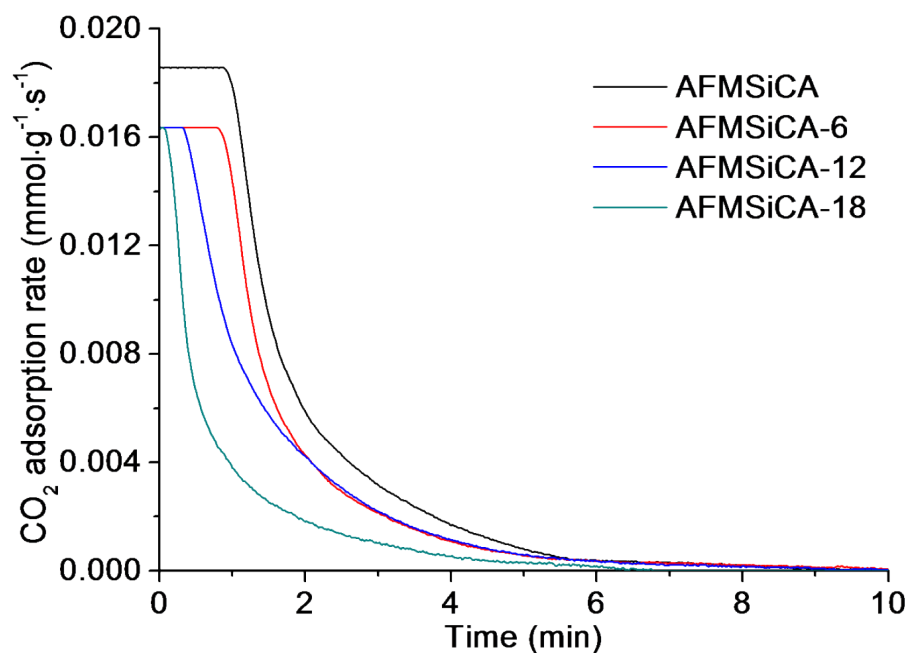


Fig. S7 CO₂ adsorption rates of RF-MSiCA-x at 50 °C in the presence of water.

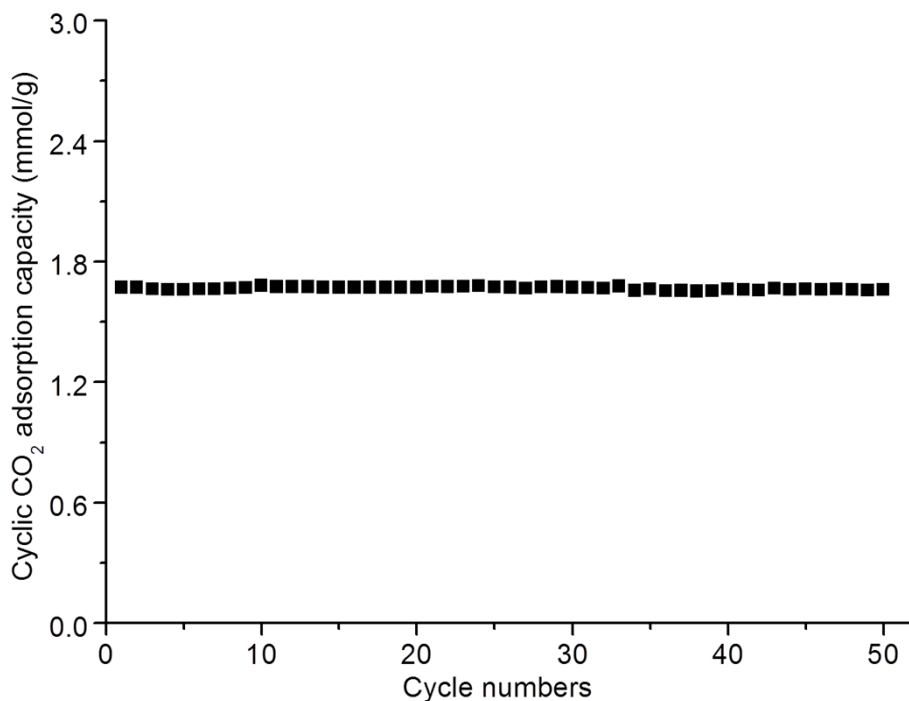


Fig. S8 Cyclic adsorption capacities of AFMSiCA at 50 °C in the absence of water (adsorption time of 20 min; adsorption gas flow rate of 310 ml/min; weight of adsorbent: 0.150g; desorption gas flow rate of 310 ml/min; desorption temperature of 100 °C).

Table S1 APTES loadings of the samples in MSiCA

Sample	APTES loading (%)
AFMSiCA	38.1
RF-MSiCA-6	32.3
RF-MSiCA-12	27.7
RF-MSiCA-18	15.7