

Supporting Information

Fabricating new MgO/C sorbent for CO₂ capture at elevated temperature

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Table S1. Adsorptive efficiency of MgO supported samples calculated from their CO₂-TPD data

Sample	Amount of MgO (mmol g ⁻¹ , a)	CO ₂ desorbed (mg g ⁻¹)	CO ₂ desorbed (mmol g ⁻¹ , b)	a/b
AC	0.0	3.0	0.07	0.0
5% MgO/AC	1.25	14.0	0.32	3.9
10% MgO/AC	2.5	20.4	0.46	5.4
20% MgO/AC	5.0	38.4	0.87	5.7
30% MgO/AC	7.5	35.5	0.81	9.3
40% MgO/AC	10	41.7	0.95	10.5
50% MgO/AC	12.5	33.9	0.77	16.2
5% MgO/SiO ₂	1.25	7.6	0.17	7.4
10% MgO/SiO ₂	2.5	12.5	0.28	8.9
20% MgO/SiO ₂	5.0	14.3	0.33	15.2
30% MgO/SiO ₂	7.5	16.2	0.37	20.3
50% MgO/SiO ₂	12.5	10.6	0.24	52.1
10% MgO/AC(coal)	2.5	11.4	0.26	9.6
20% MgO/AC(coal)	5.0	19.8	0.45	11.1
50% MgO/AC(coal)	12.5	12.3	0.28	44.6
20% MgO/AC(n)	5.0	14.0	0.32	15.6

Table S2. Basicity of MgO supported on porous material

Amount of MgO (wt.-%)	5	10	20	30
Theoretical value ($\text{mmol}\cdot\text{g}^{-1}$, A)	2.50	5.00	10.00	15.00
Titrated on MgO/SiO ₂ ($\text{mmol}\cdot\text{g}^{-1}$)	2.35	4.54	8.69	12.66
MgO in MgO/SiO ₂ (wt.-%)	4.7	9.1	17.4	25.3
Titrated on MgO/AC ($\text{mmol}\cdot\text{g}^{-1}$, B)	2.40	4.78	8.65	11.64
MgO in MgO/AC (wt.-%)	4.8	9.6	17.3	23.3
AC in precursor composite (g)	0.95	0.90	0.80	0.70
Salt in precursor composite (g)	0.27	0.54	1.07	1.61
Resulting sample (g)	1.06	1.12	1.24	1.36
B/A	0.96	0.96	0.87	0.78

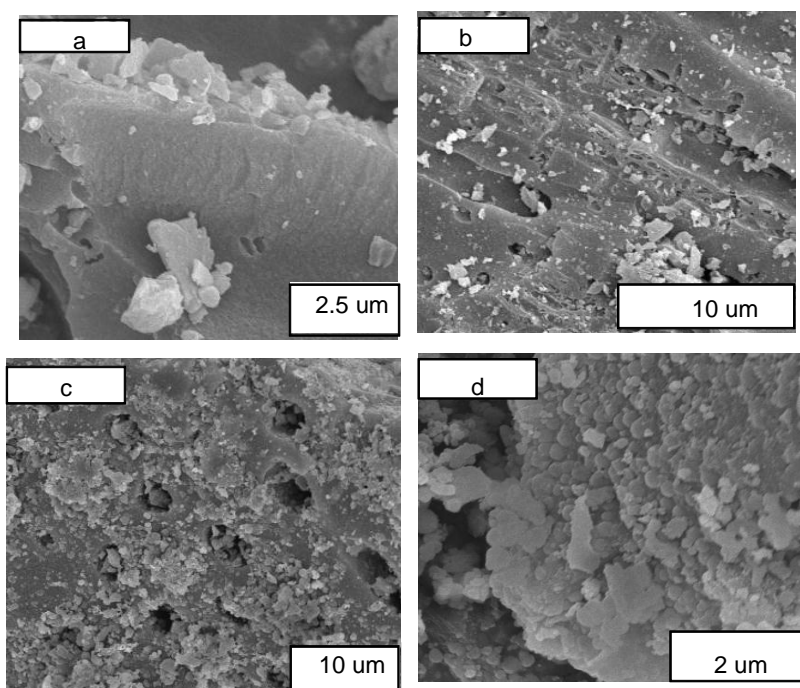


Figure S1. SEM images of AC loaded with MgO of (a) 5%, (b) 10%, (c) 20% and (d) 30%.

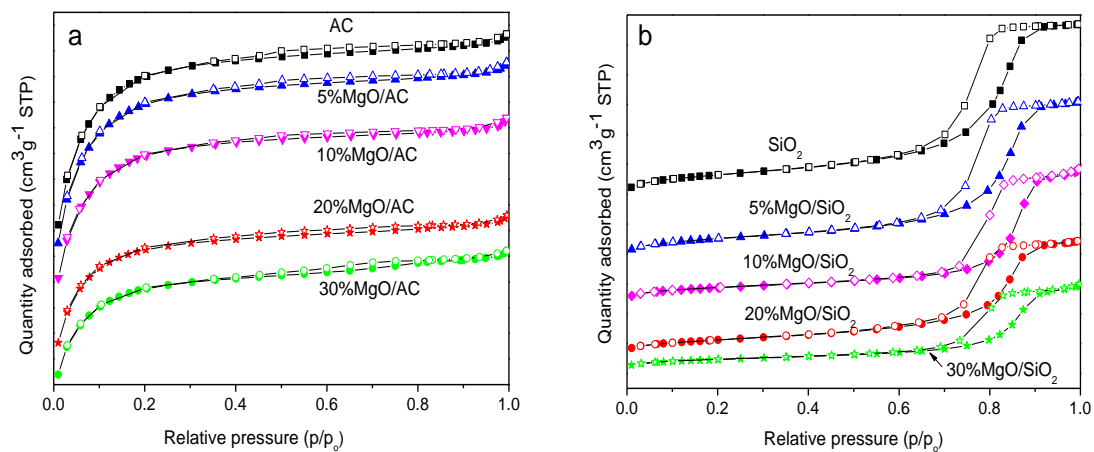


Figure S2. Nitrogen adsorption isotherms of (a) MgO/AC and (b) MgO/SiO₂ samples

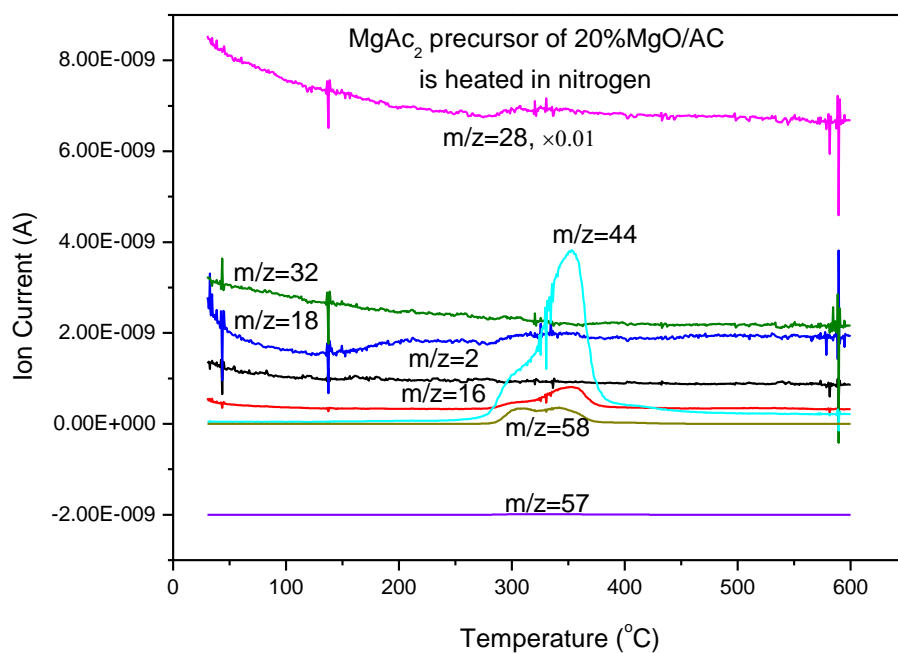


Figure S3. The MS signal of the precursor of 20% MgO/AC sample