

Supporting Information

Control over Crystallization of CaCO₃ micro- particles by A Novel CO₂SM

Bo Guo, Tianxiang Zhao, Feng Sha, Fei Zhang, Qiang Li, and Jianbin Zhang*

College of Chemical Engineering, Inner Mongolia University of Technology, Huhhot 010051, China

* To whom correspondence should be addressed. Tel.: +86-10-62751529; Fax: +86-10-62751529. E-mail:
tadzhang@pku.edu.cn

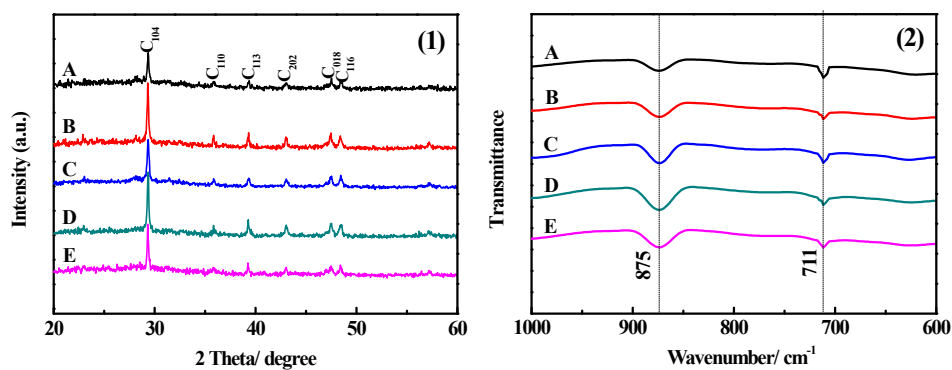


Fig. S1 XRD patterns (1) and FTIR spectra (2) of as-obtained samples in 0.6 g·L⁻¹ concentration of CO₂SM for 1 h at different reaction temperature: (A) 80 °C; (B) 90 °C; (C) 100 °C; (D) 110 °C; and (E) 120 °C.

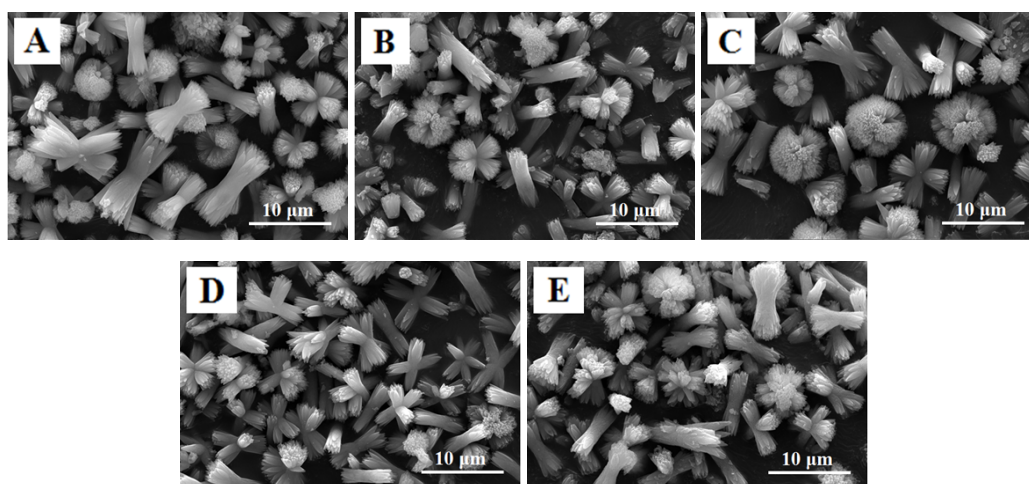


Fig. S2 SEM images of CaCO₃ micro particles were acquired under different reaction time at 100 °C. When the concentration of CO₂SM was 0.6 g·L⁻¹, the reaction time were: (Sample A: 60 min); (Sample B: 90 min); (Sample C: 120 min); (Sample D: 150 min); and (Sample E: 180 min).

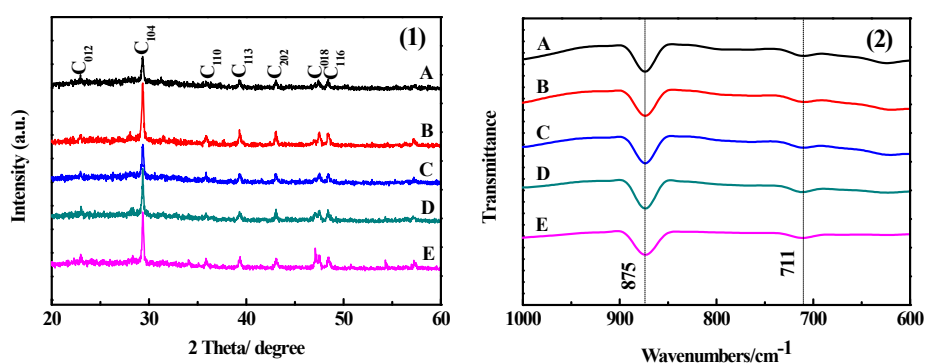


Fig. S3 XRD patterns (1) and FTIR spectra (2) of as-obtained samples in 0.6 g·L⁻¹ concentration of CO₂SM at 100 °C at different reaction time: (A) 60 min; (B) 90 min; (C) 120 min; (D) 150 min; and (E) 180 min.

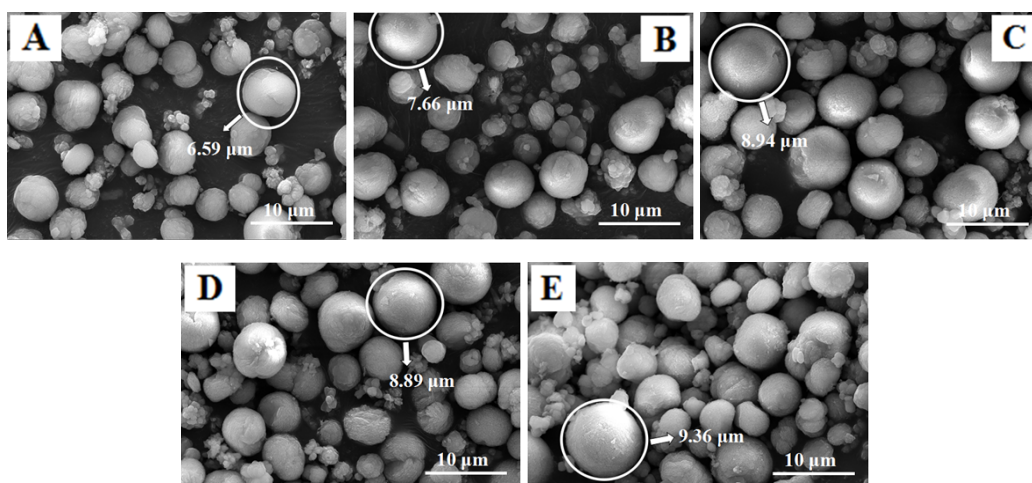


Fig. S4 SEM images of CaCO_3 micro particles were acquired under different reaction time at 120 °C. When the concentration of CO_2SM was $40 \text{ g}\cdot\text{L}^{-1}$, the reaction time were: (Sample A: 60 min); (Sample B: 90 min); (Sample C: 120 min); (Sample D: 150 min); and (Sample E: 180 min).

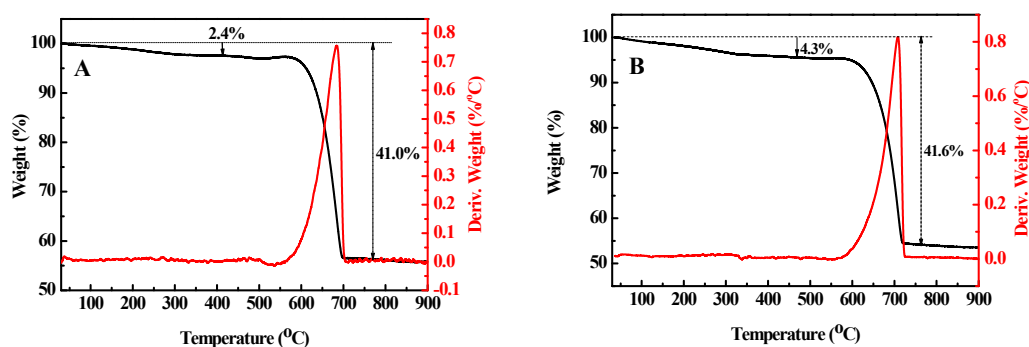


Fig. S5 Thermogravimetric analysis curves of as-prepared CaCO_3 samples. A: belt-like shape and B: spherical-like shape.

Table S1 The CaCO_3 samples prepared under different the reaction temperature: (Sample A: 80 °C); (Sample B: 90 °C); (Sample C: 100 °C); (Sample D: 110 °C); and (Sample E: 120 °C), when the concentration of CO_2SM was $0.6 \text{ g}\cdot\text{L}^{-1}$, $t = 1 \text{ h}$, measured particles size, and average size for each sample.

Number	Measured particles size ($\mu\text{m} \times \mu\text{m}$) of each sample				
	A	B	C	D	E
1	10.11×2.34	9.31×1.83	8.72×1.76	8.51×1.71	8.29×1.49
2	8.5 ×1.70	7.66×1.70	7.66×1.28	8.29×1.59	6.81×1.49
3	8.29×1.49	6.38×1.49	7.23×1.49	6.81×1.28	8.27×1.28
4	8.51×1.91	—	7.87×1.71	5.74×1.28	6.76×1.06

5	6.17×1.28	—	8.72×1.49	—	6.17×1.06
6	8.72×1.91	—	5.53×1.28	—	—
7	—	—	7.87×1.49	—	—
8	—	—	6.81×1.28	—	—
9	—	—	6.17×1.17	—	—
Average	8.39×1.77	7.78×1.67	7.39×1.44	7.33×1.46	7.26×1.27

Table S2 The CaCO₃ samples prepared under different the reaction temperature: (Sample A: 80 °C); (Sample B: 90 °C); (Sample C: 100 °C); (Sample D: 110 °C); and (Sample E: 120 °C), when the concentration of CO₂SM was 40 g·L⁻¹, *t* = 2 h, measured particles size, and average size for each sample.

Number	Measured particles size (µm) of each sample				
	A	B	C	D	E
1	4.68	7.23	8.09	4.89	4.26
2	5.11	5.53	7.02	4.26	2.96
3	5.32	5.74	4.26	3.83	3.71
4	4.89	5.53	5.74	3.41	3.71
5	5.74	6.17	4.89	3.83	2.96
6	4.89	5.79	5.32	3.62	2.59
7	5.53	5.26	5.11	4.26	3.33
8	3.95	3.95	6.17	2.55	3.69
9	4.74	5.78	2.34	4.26	4.04
10	4.47	4.74	5.96	4.26	4.07
11	4.89	6.84	—	—	3.33
12	5.01	—	—	—	2.96
13	—	—	—	—	3.69
14	—	—	—	—	2.96
15	—	—	—	—	3.33
16	—	—	—	—	3.42
17	—	—	—	—	3.16
18	—	—	—	—	3.42

19	—	—	—	—	3.42
20	—	—	—	—	3.03
21	—	—	—	—	2.89
22	—	—	—	—	3.16
23	—	—	—	—	4.21
24	—	—	—	—	4.09
Average	4.94	5.69	5.49	3.92	3.43

Table S3 The CaCO₃ samples prepared under different reaction time at 120 °C. The reaction time were: (Sample A: 60 min); (Sample B: 90 min); (Sample C: 120 min); (Sample D: 150 min); and (Sample E: 180 min), when the concentration of CO₂SM was 40 g·L⁻¹, measured particles size, and average size for each sample.

Number	Measured particles size (µm) of each sample				
	A	B	C	D	E
1	6.59	7.66	8.94	8.89	9.36
2	4.04	5.71	6.57	7.14	7.35
3	5.53	5.99	4.86	6.83	6.87
4	4.26	6.14	7.71	7.16	5.86
5	5.53	6.03	6.61	5.74	6.12
6	3.95	3.68	7.14	6.58	—
7	5.01	4.47	7.09	—	—
8	3.68	4.74	5.79	—	—
9	—	4.21	5.66	—	—
10	—	—	5.26	—	—
11	—	—	4.74	—	—
12	—	—	4.72	—	—
Average	4.82	5.41	6.26	7.06	7.12