

Supporting Information

HABS-controlled Growth of Aragonite Based Polymorphic Symbiotic

CaCO₃ Crystals in Emulsion

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Table S1. Fraction of vaterite, aragonite and calcite in kerosene emulsions with various concentrations of HABS.

Sample	[CaCl ₂] (mol/L)	[Na ₂ CO ₃] (mol/L)	HABS (mg/L)	Temp (°C)	Time (min)	Content of Vaterite	Content of Aragonite	Content of Calcite
1a	0.01	0.01	200	45	60	39.73%	29.70%	30.57%
1b	0.01	0.01	400	45	60	44.22%	10.07%	45.71%
1c	0.01	0.01	600	45	60	53.72%	12.27%	34.01%
1d	0.01	0.01	800	45	60	49.26%	0	50.74%
1e	0.01	0.01	1000	45	60	69.11%	0	30.89%

Table S2. Fraction of vaterite, aragonite and calcite in kerosene emulsions with various reaction times.

Sample	[CaCl ₂] (mol/L)	[Na ₂ CO ₃] (mol/L)	HABS (mg/L)	Temp (°C)	Time (min)	Content of Vaterite	Content of Aragonite	Content of Calcite
2a	0.01	0.01	600	45	5	86.11%	0	13.89%
2b	0.01	0.01	600	45	10	88.54%	0	11.46%
2c	0.01	0.01	600	45	20	93.01%	0	6.99%
2d	0.01	0.01	600	45	30	82.96%	4.55%	12.49%
2e	0.01	0.01	600	45	60	53.72%	12.27%	34.01%

Table S3. Fraction of vaterite, aragonite and calcite in kerosene emulsions with various reaction temperatures.

Sample	[CaCl ₂] (mol/L)	[Na ₂ CO ₃] (mol/L)	HABS (mg/L)	Temp (°C)	Time (min)	Content of Vaterite	Content of Aragonite	Content of Calcite
3a	0.01	0.01	600	35	60	88.97%	0	11.03%
3b	0.01	0.01	600	45	60	43.57%	5.55%	50.88%
3c	0.01	0.01	600	55	60	41.48%	19.19%	39.33%
3d	0.01	0.01	600	65	60	43.17%	47.38%	9.45%
3e	0.01	0.01	600	75	60	18.03%	65.06%	16.91%
3f	0.01	0.01	600	85	60	16.10%	66.74%	17.16%

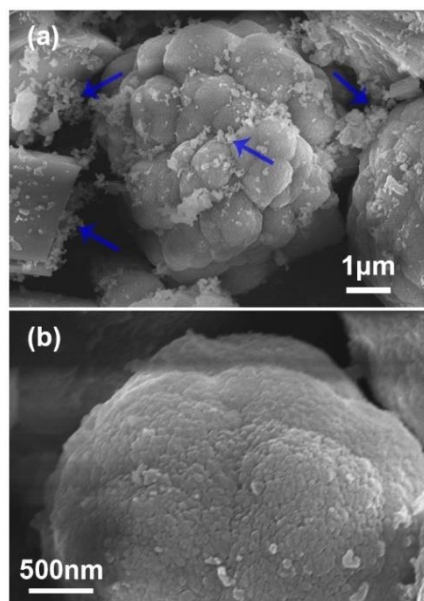


Figure S1. SEM images of vaterites particles and the corresponding enlarged view.

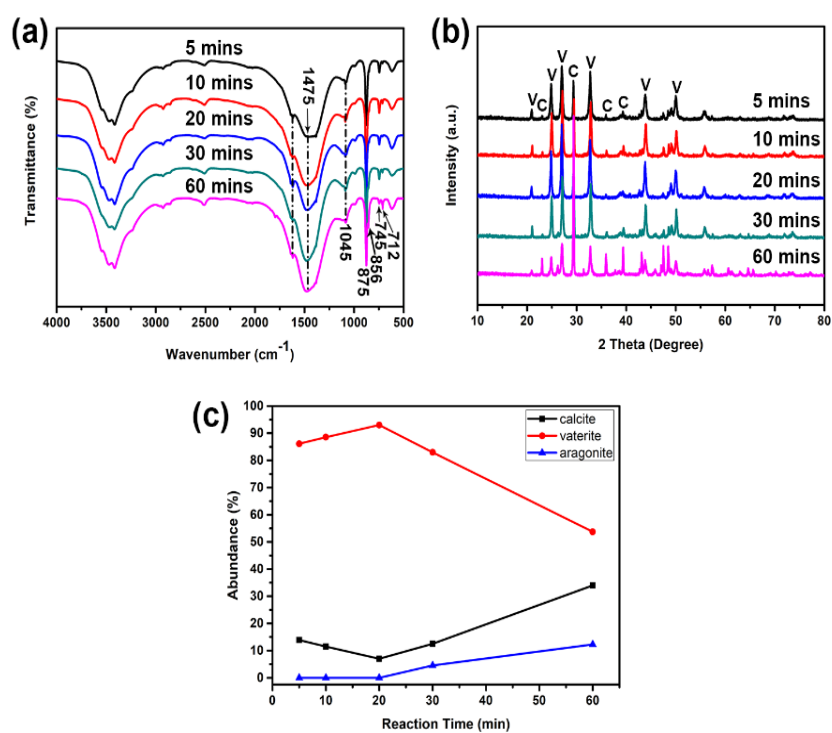


Figure S2. FTIR, XRD and content variation of CaCO_3 under various reaction times (5 mins, 10 mins, 20 mins, 30 mins, and 60 mins).

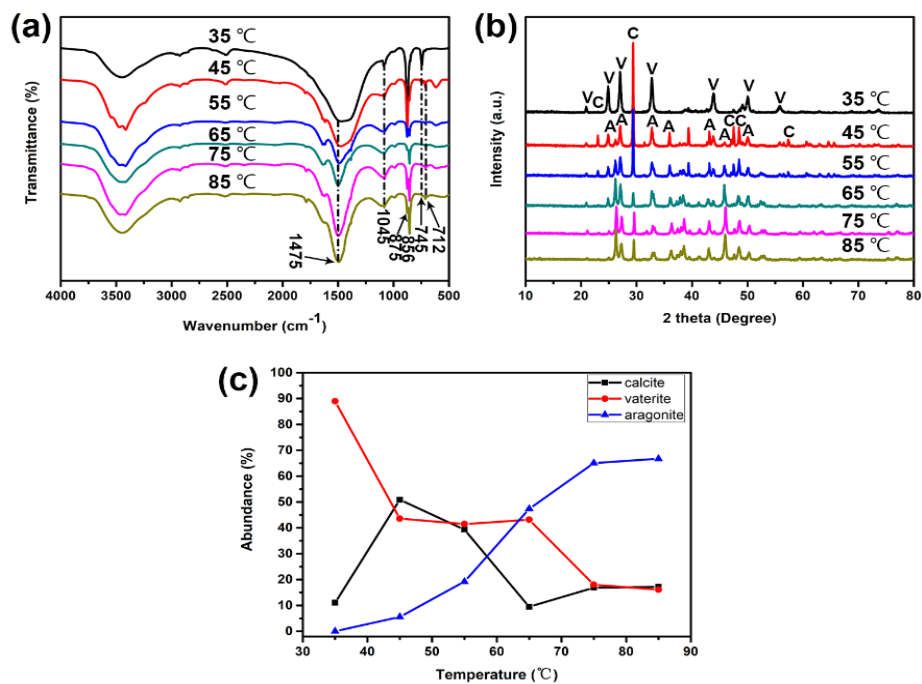


Figure S3. FTIR, XRD and content variation of CaCO₃ under reaction temperature(35 °C, 45 °C, 55 °C, 65 °C, 75 °C, and 85 °C).