

Supporting Information

Investigation on the adsorption of additives for the oriented dissolution of calcite

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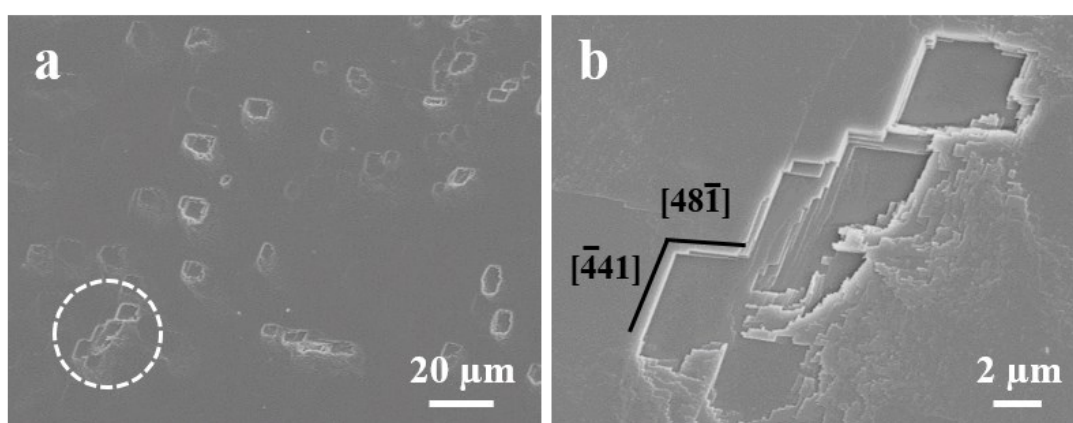


Figure S1. Side view (a, b) SEM images of calcite surfaces obtained in pure water at 50 °C. (a, b) Side view images were captured with electron beam perpendicular to calcite {104} planes, the same for the side view images in the following text.

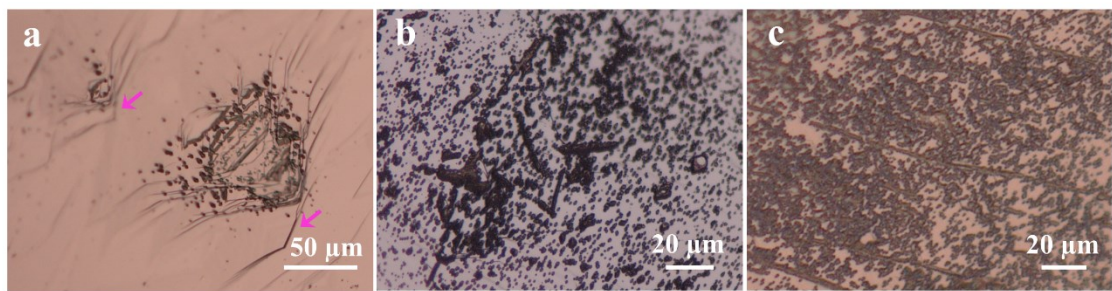


Figure S2. Side view LM images of calcite surfaces obtained in aqueous solution in the presence of tween 20 with different concentrations at 50 °C. (a) 0.1 mg/mL; (b) 0.5 mg/mL; (c) 1 mg/mL.

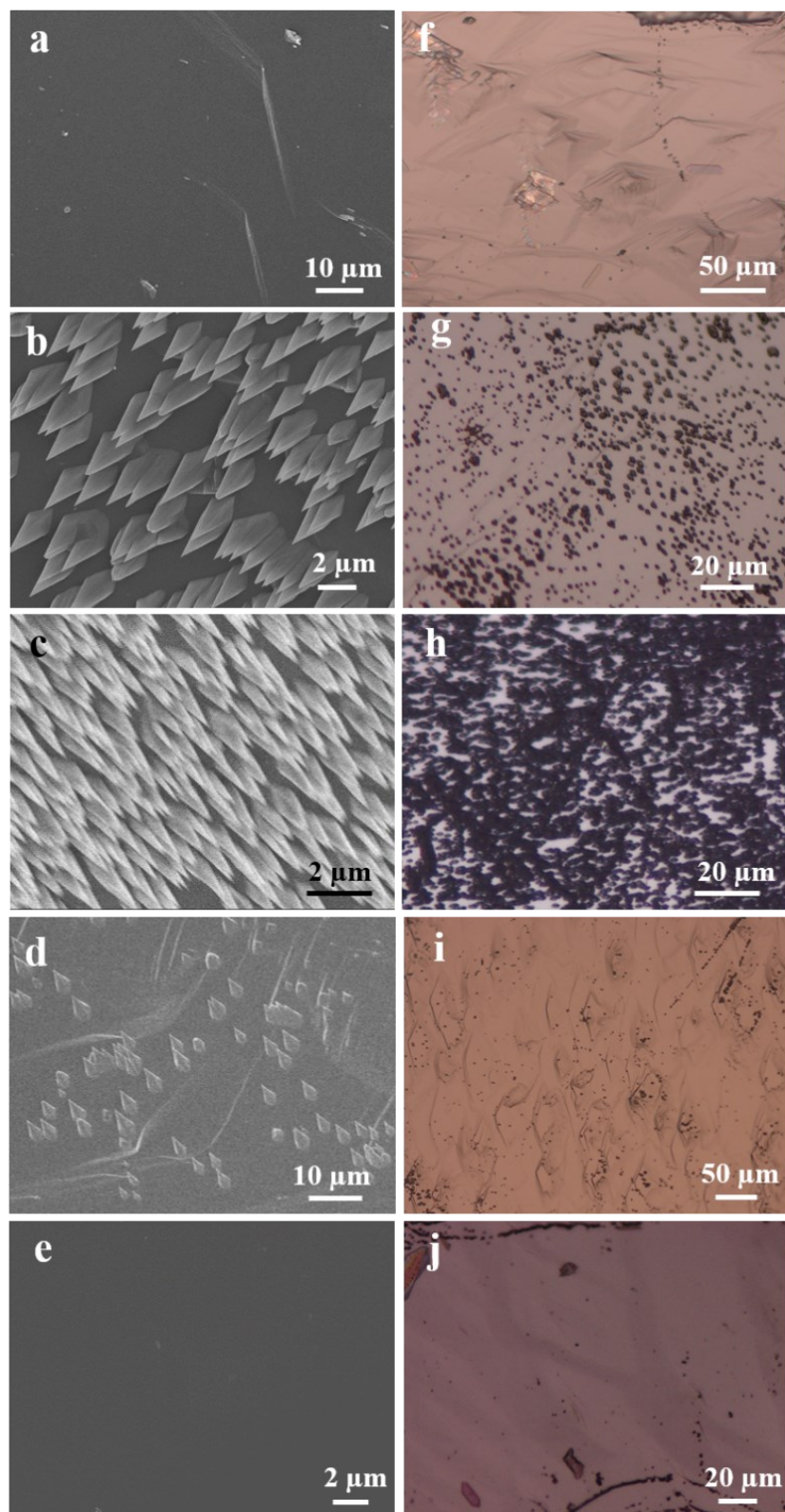


Figure S3. Side view SEM (a-e) and LM (f-j) images of calcite surfaces obtained in aqueous solution in the presence of tween 40 with different concentrations at 50 °C. (a, f) 0.05 mg/mL; (b, g) 0.1 mg/mL; (c, h) 1 mg/mL; (d, i) 5 mg/mL; (e, j) 8 mg/mL.

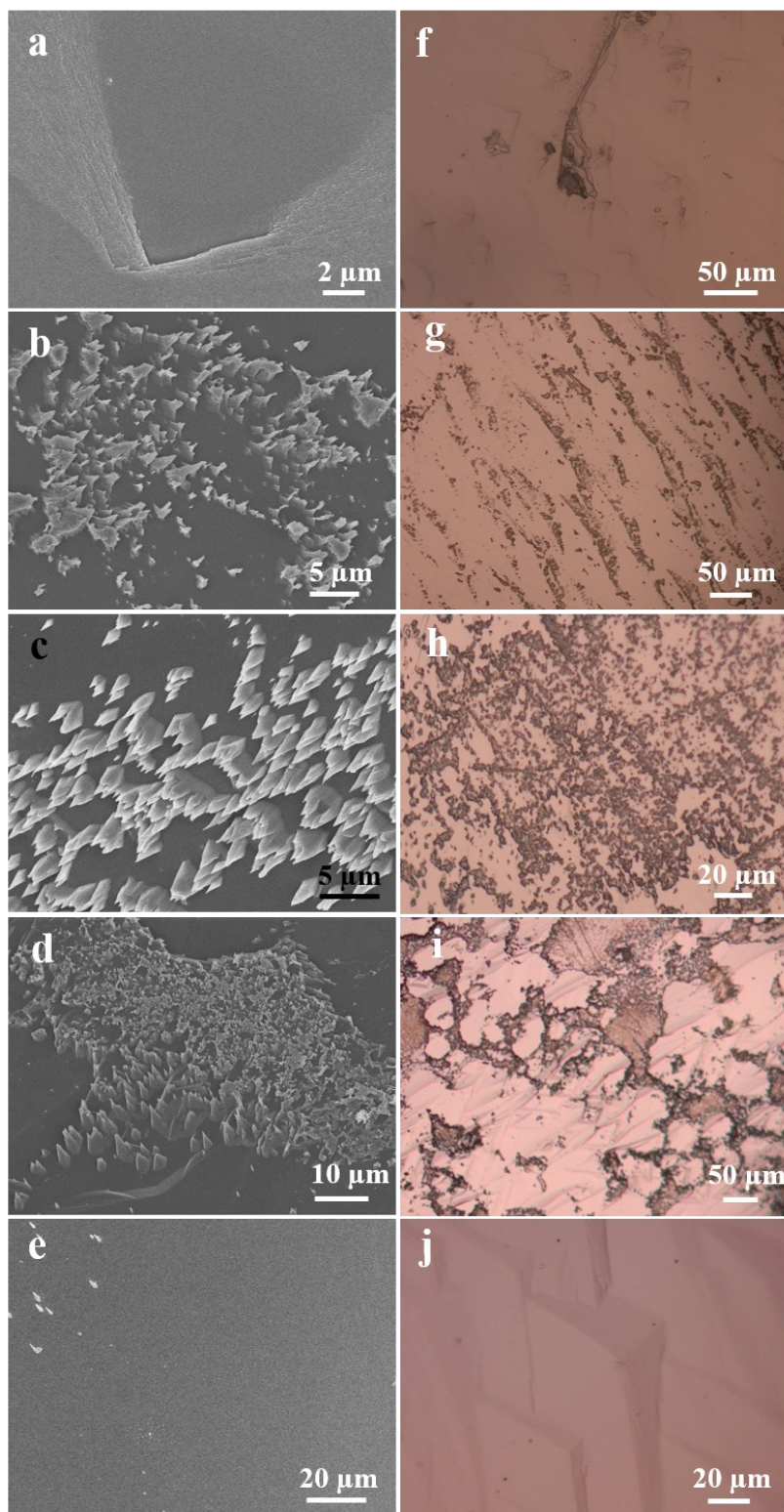


Figure S4. Side view SEM (a-e) and LM (f-j) images of calcite surfaces obtained in aqueous solution in the presence of tween 60 with different concentrations at 50 °C. (a, f) 0.05 mg/mL; (b, g) 0.1 mg/mL; (c, h) 1 mg/mL; (d, i) 10 mg/mL; (e, j) 20 mg/mL.

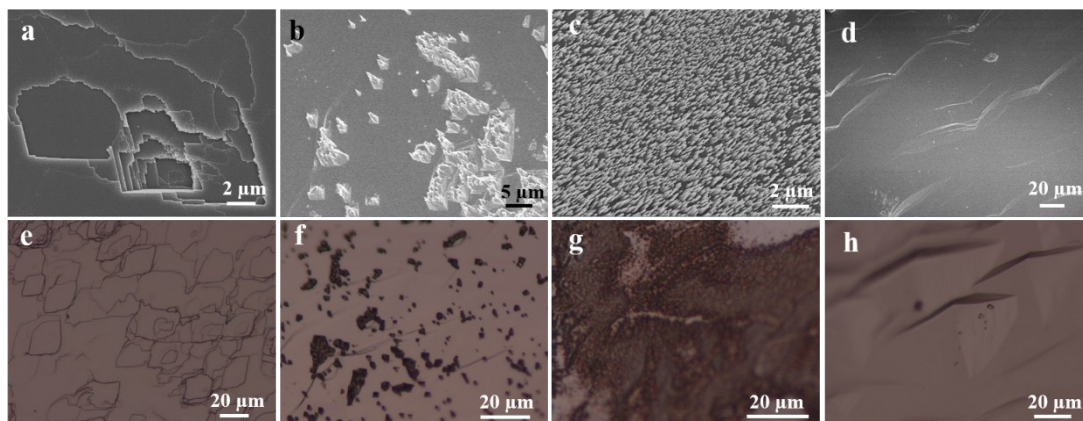


Figure S5. Side view SEM (a-d) and LM (e-h) images of calcite surfaces obtained in aqueous solution in the presence of tween 80 with different concentrations at 50 °C. (a, e) 0.1 mg/mL; (b, f) 5 mg/mL; (c, g) 7 mg/mL; (d, h) 10 mg/mL.

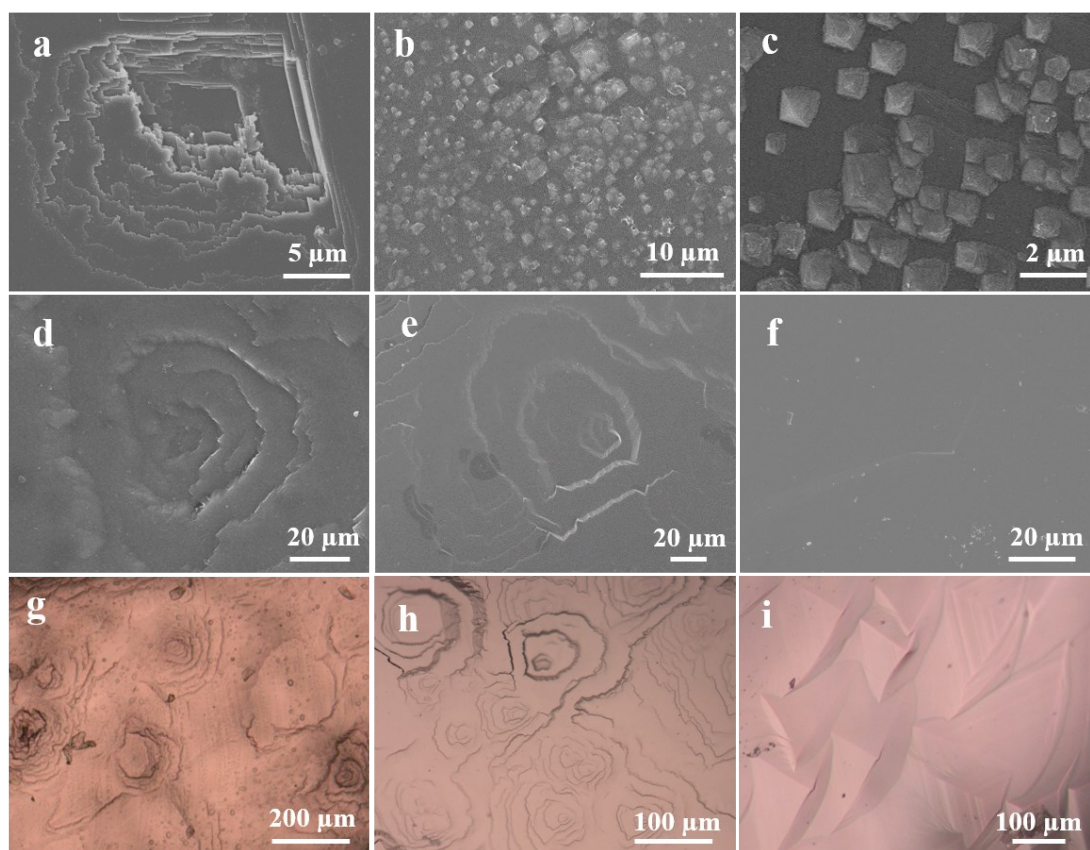


Figure S6. Side view SEM (a-f) and LM (g-i) images of calcite surfaces obtained in aqueous solution in the presence of STS with different concentrations at 50 °C. (a) 0.01 mg/mL; (b) 0.5 mg/mL; (c) 3 mg/mL; (d, g) 5 mg/mL; (e, h) 15 mg/mL; (f, i) 20 mg/mL.

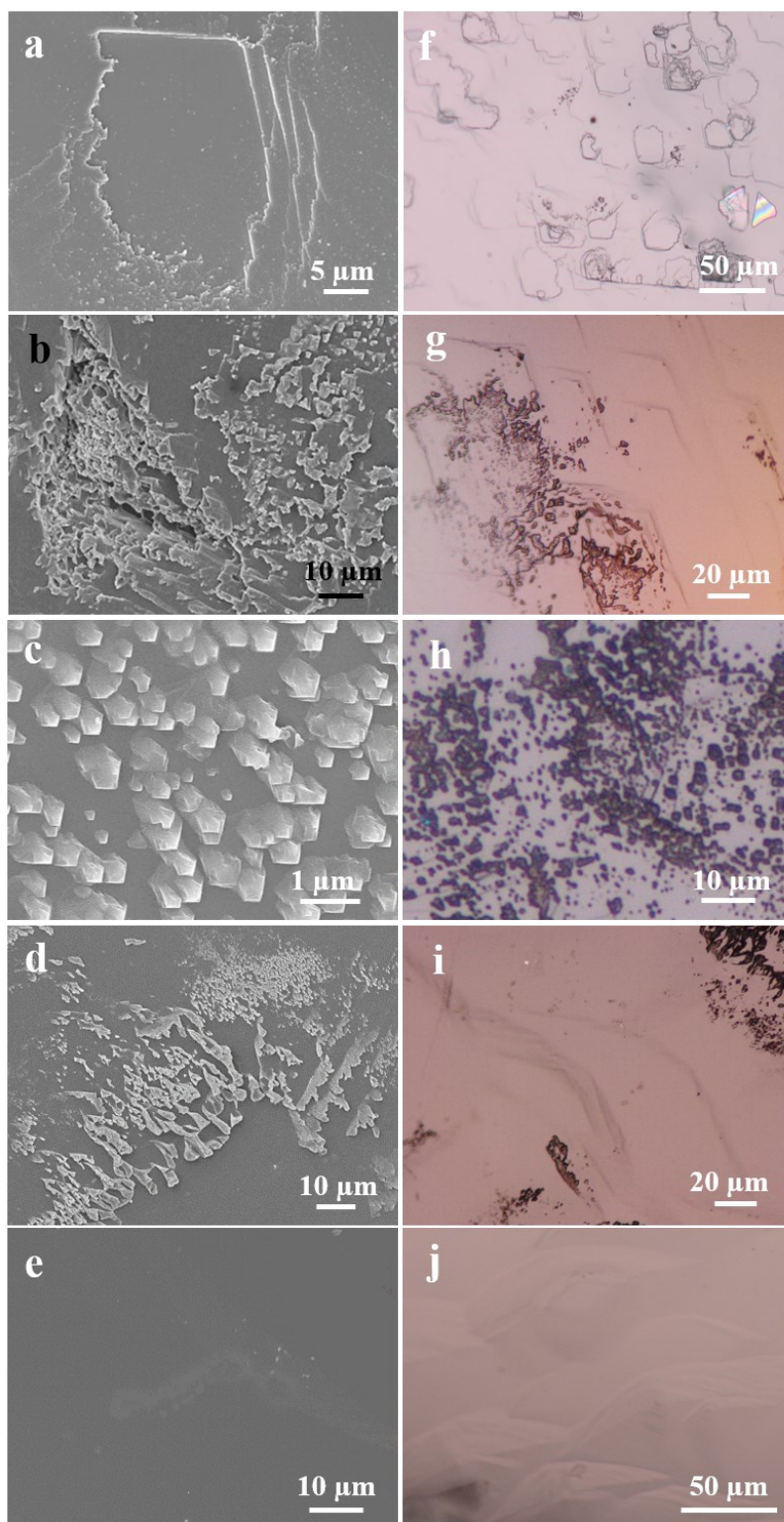


Figure S7. Side view SEM (a-e) and LM (f-j) images of calcite surfaces obtained in aqueous solution in the presence of SHS with different concentrations at 50 °C. (a, f) 0.01 mg/mL; (b, g) 0.5 mg/mL; (c, h) 1 mg/mL; (d, i) 5 mg/mL; (e, j) 10 mg/mL.

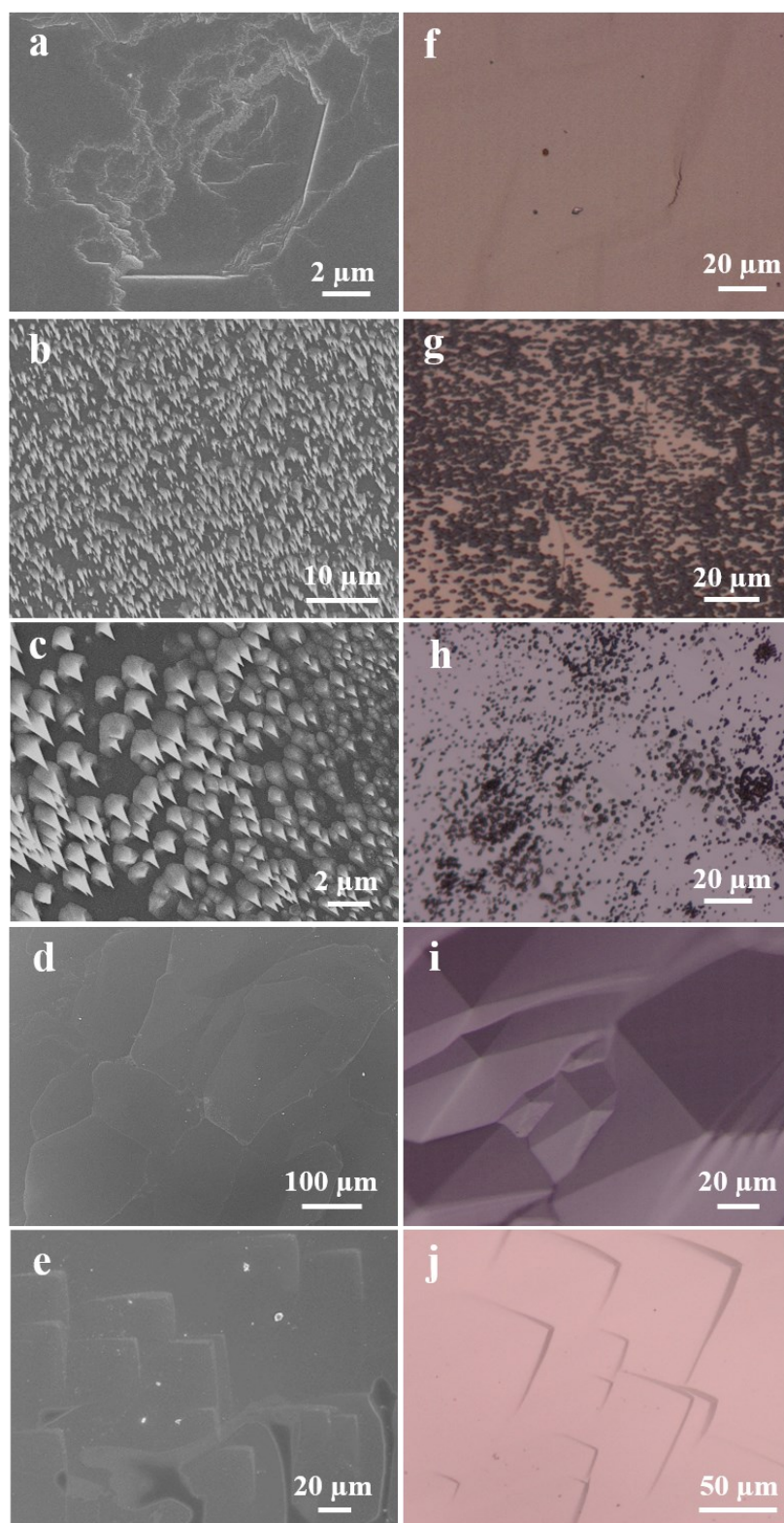


Figure S8. Side view SEM (a-e) and LM (f-j) images of calcite surface morphology obtained in aqueous solution in the presence of SPP with different concentrations at 50 °C. (a, f) 0.001 mg/mL; (b, g) 0.005 mg/mL; (c, h) 0.1 mg/mL; (d, i) 1 mg/mL; (e, j) 10 mg/mL.

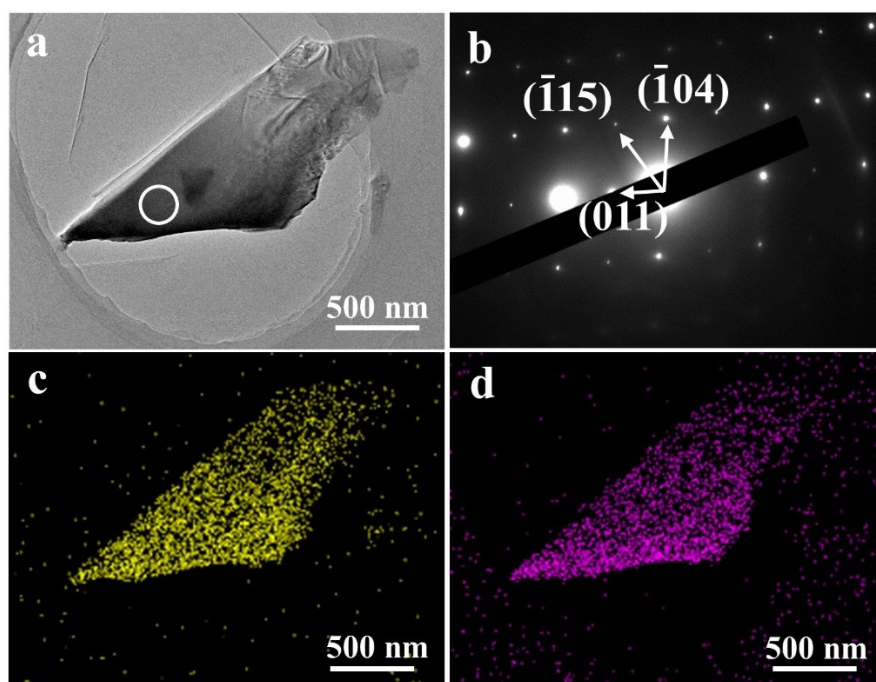


Figure S9. (a) is TEM image of calcite micropyramid obtained in aqueous solution in the present of 0.1 mg/mL of PAAs. (b) is selected area electron diffraction (SAED) of of (a) that marked by white circle. It exhibits (011), ($\bar{1}15$) and ($\bar{1}04$) of rhombohedral calcite, the crystal plane spacing corresponding to the diffraction point is 4.19, 2.75, 3.04 Å, respectively. (c) and (d) is the corresponding element mapping image of calcium and oxygen atoms were labeled by yellow and pink, respectively.

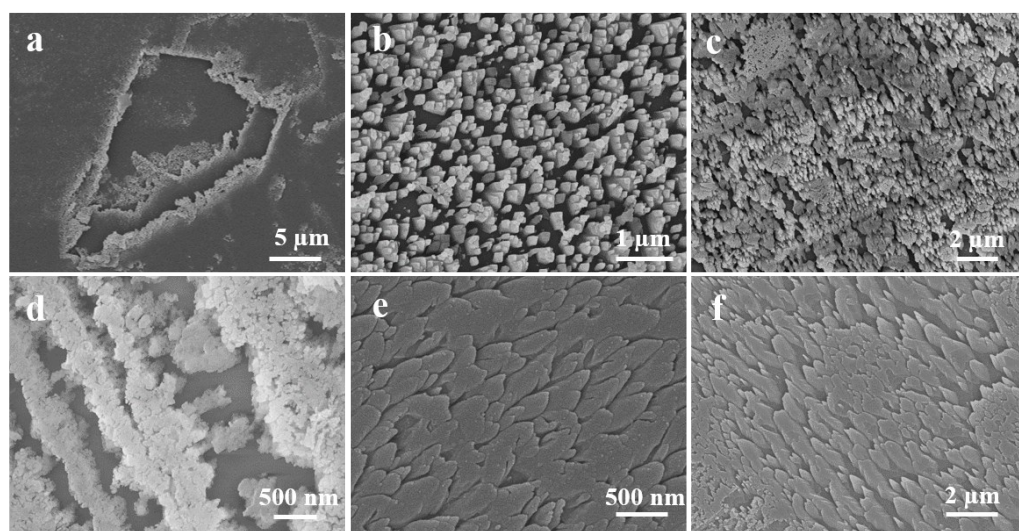


Figure S10. Side view (a-f) SEM images of calcite surfaces obtained in aqueous solution in the presence of SOS with different concentrations at 50 °C. (a) 0.1 mg/mL; (b) 0.25 mg/mL; (c) 0.5 mg/mL; (d) 1 mg/mL; (e) 20 mg/mL; (f) 30 mg/mL.

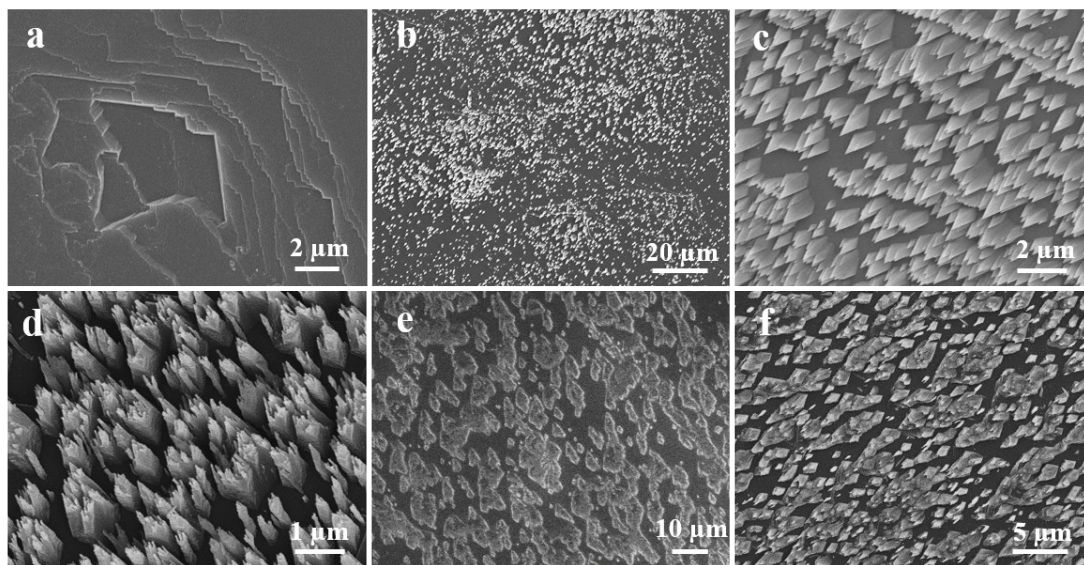


Figure S11. Side view (a-f) SEM images of calcite surfaces obtained in aqueous solution in the presence of Triton x-100 with different concentrations at 50 °C. (a) 0.25 mg/mL; (b) 0.5 mg/mL; (c) 1 mg/mL; (d) 15 mg/mL; (e) 20 mg/mL; (f) 50 mg/mL.

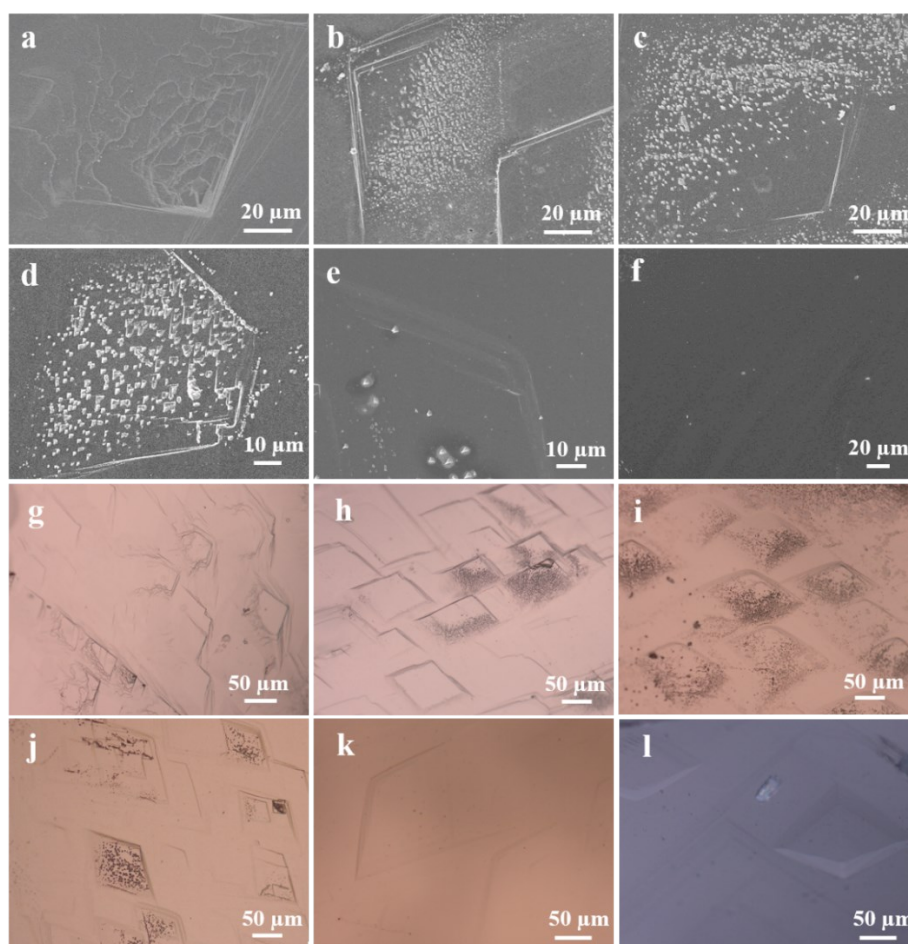


Figure S12. Side view SEM (a-f) and LM (g-l) images of calcite surfaces obtained in aqueous solution in the presence of DB with different concentrations at 50 °C. (a, g) 0.1 mg/mL; (b, h) 1 mg/mL; (c, i) 10 mg/mL; (d, j) 30 mg/mL; (e, k) 50 mg/mL; (f, l) 80 mg/mL.

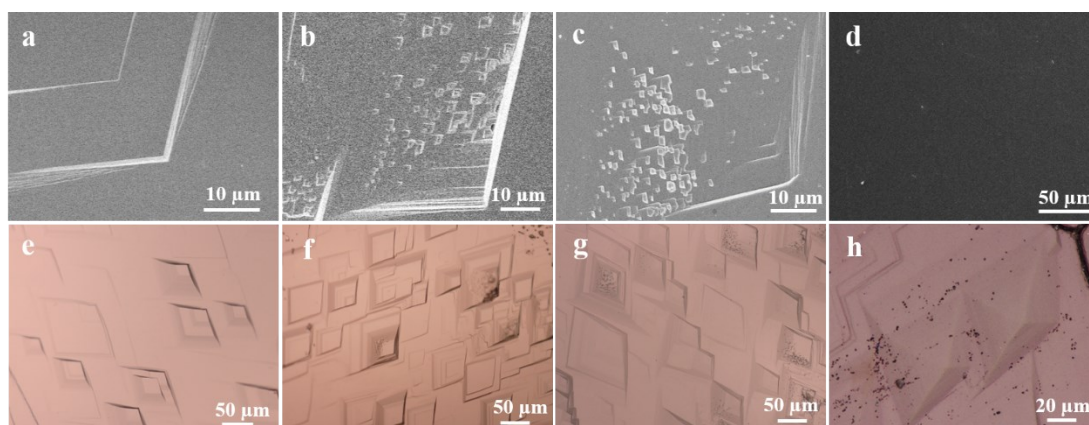


Figure S13. Side view SEM (a-d) and LM (e-h) images of calcite surfaces obtained in aqueous solution in the presence of HTAB with different concentrations at 50 °C. (a, e) 0.1 mg/mL; (b, f) 1 mg/mL; (c, g) 10 mg/mL; (d, h) 20 mg/mL.

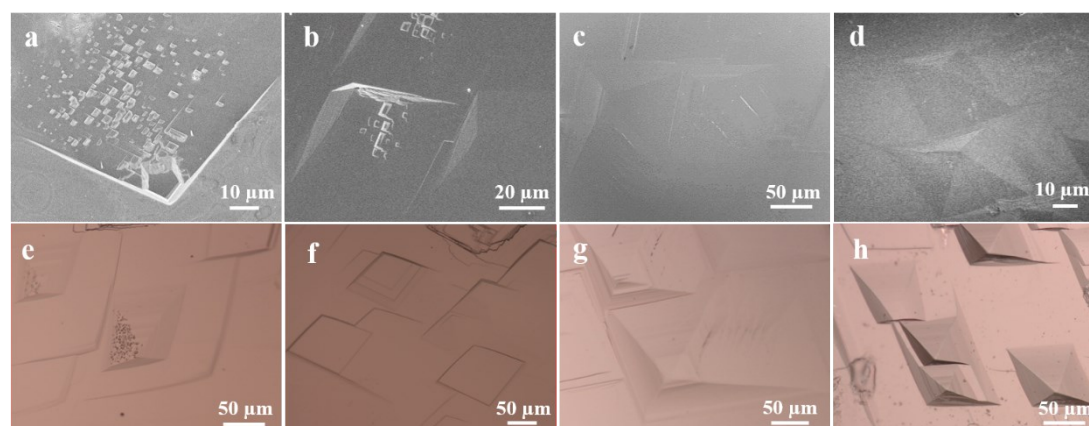


Figure S14. Side view SEM (a-d) and LM (e-h) images of calcite surfaces obtained in aqueous solution in the presence of STAB with different concentrations at 50 °C. (a, e) 0.1 mg/mL; (b, f) 1 mg/mL; (c, g) 5 mg/mL; (d, h) 10 mg/mL.

Table S1: The pH value of cationic additives in initial solutions of different concentrations

pH		Concentration (mg/ml)								
		0.1	1	5	8	10	20	30	50	80
Additives	DB	6.59	6.14			5.88		5.99	5.85	5.75
	DTAB	6.04	6.41	5.91	5.78	6.23			5.09	
	HTAB	6.03	6.76			5.60	5.68			
	STAB	5.94	5.55			4.57				