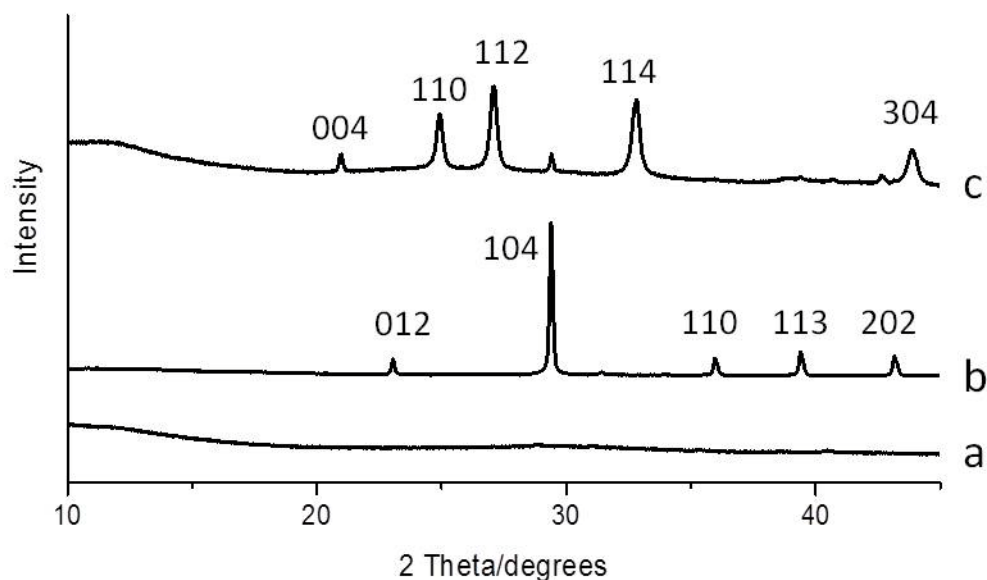


Supporting Information

Solid State Crystallization of Amorphous Calcium Carbonate Nanoparticles Leads to Polymorph Selectivity

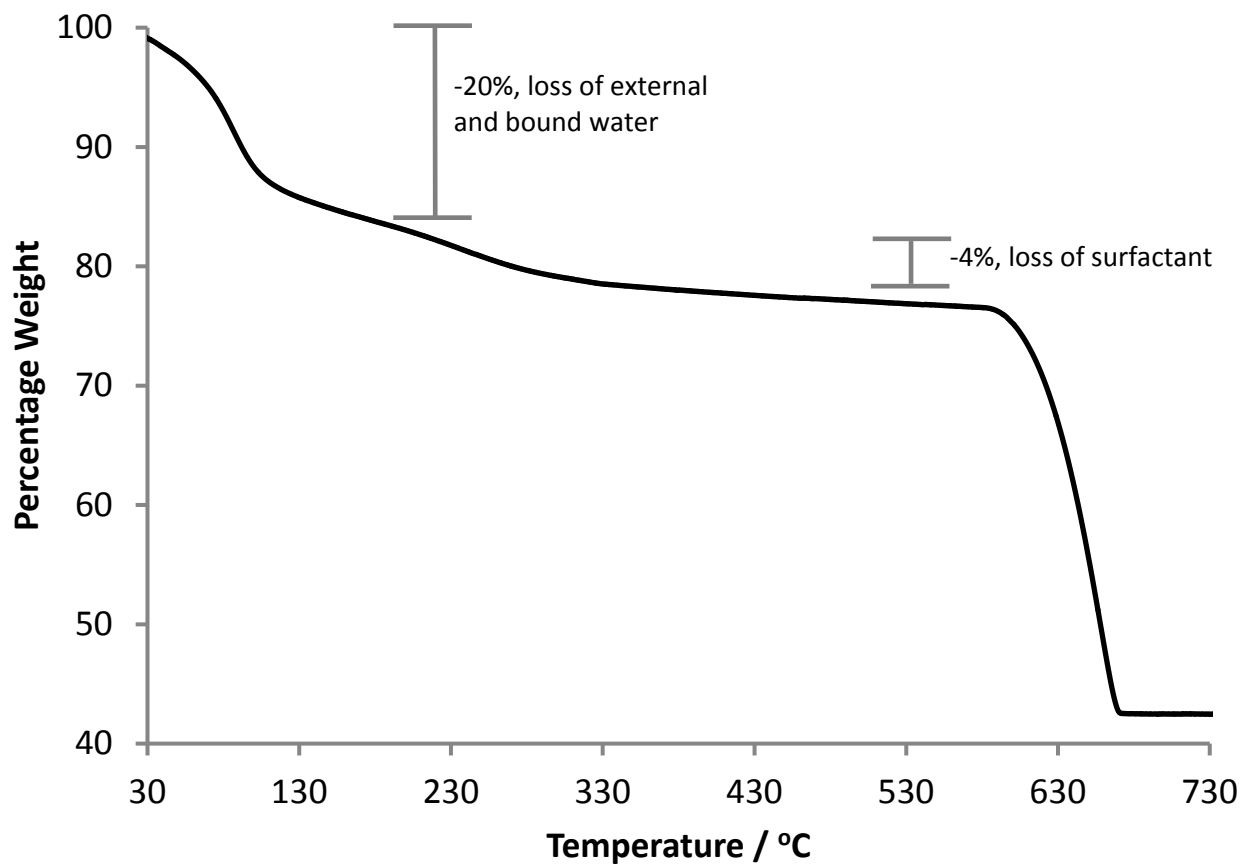
Elizabeth H. Noel, Yi-Yeoun Kim, John M. Charnock and Fiona C. Meldrum

Figure S1: X-ray diffraction spectra of (a) AOT microemulsion ACC and (b) calcite particles produced on heating the microemulsion ACC particles at $10\text{ }^{\circ}\text{C min}^{-1}$ to $70\text{ }^{\circ}\text{C}$, followed by isothermal incubation at $70\text{ }^{\circ}\text{C}$ for 12 hours (c) vaterite particles produced on heating microemulsion ACC particles at $1\text{ }^{\circ}\text{C min}^{-1}$ to 70°C , followed by isothermal incubation at $70\text{ }^{\circ}\text{C}$ for 12 hours.



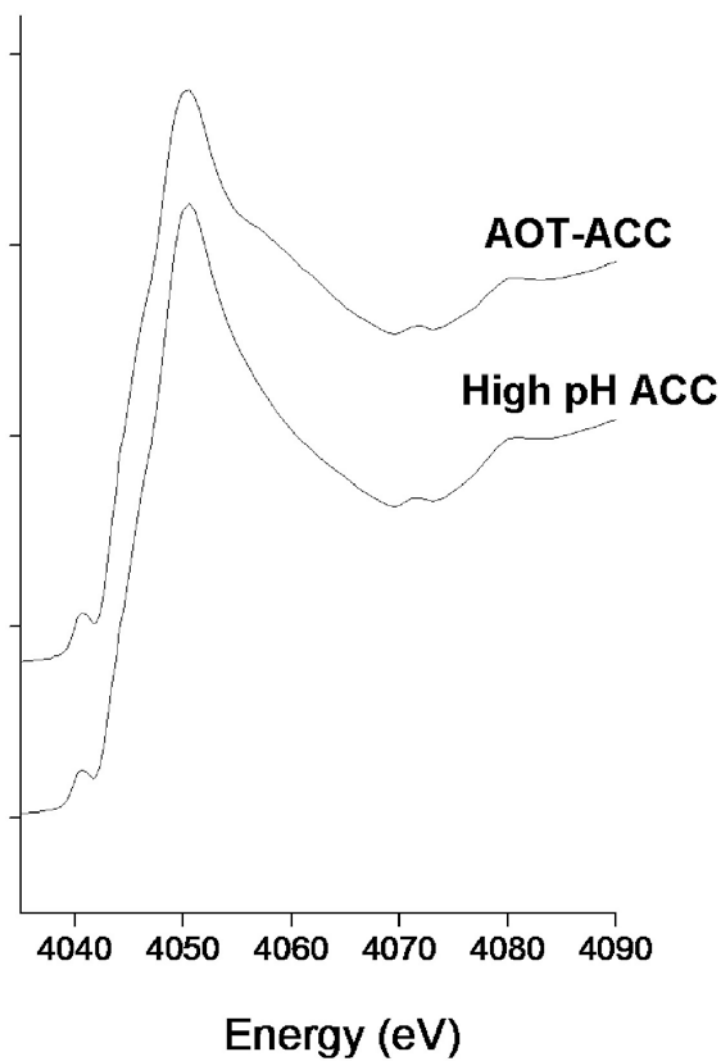
Supporting Information

Figure S2: Thermogravimmetric analysis (TGA) data for dry AOT microemulsion ACC, obtained at a heating rate of $5^{\circ}\text{C min}^{-1}$ and showing the temperatures at which water is lost from the sample.



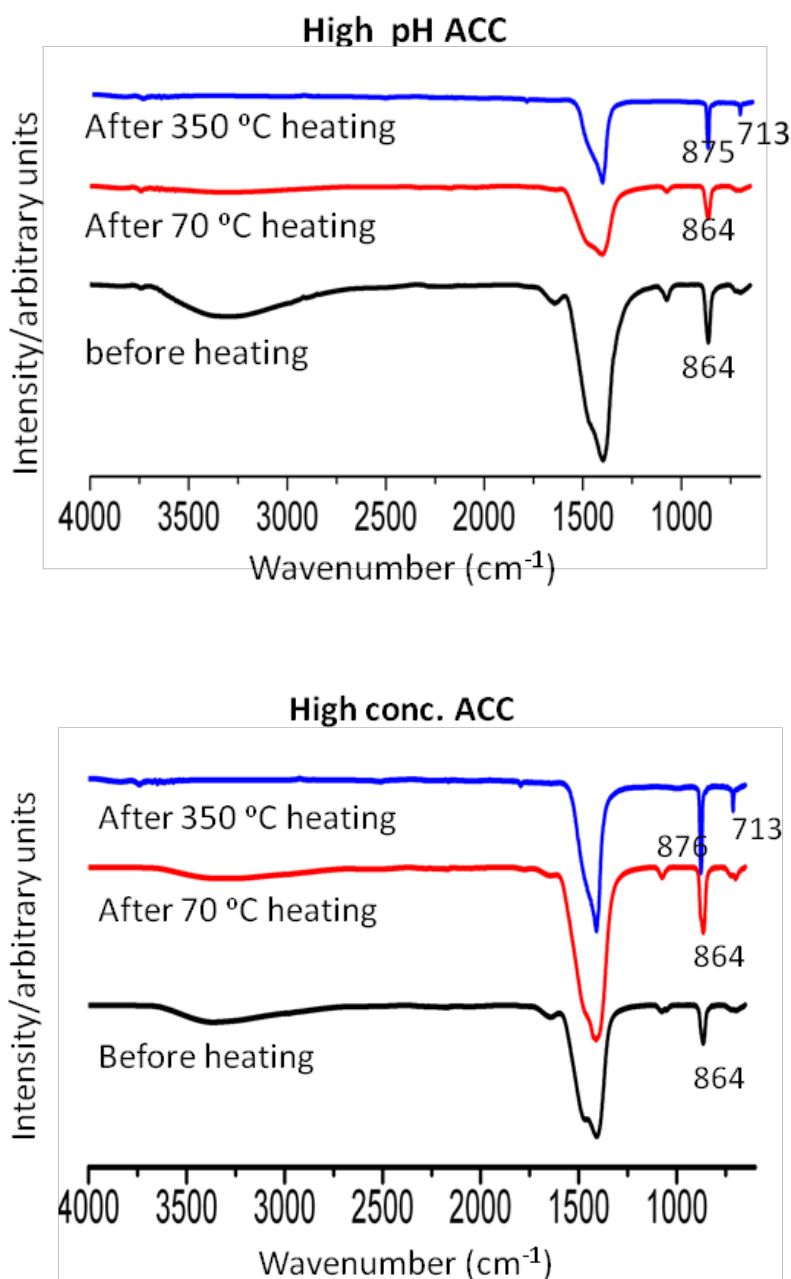
Supporting Information

Figure S3: X-ray absorption spectra showing pre-edge and XANES regions of “high pH” ACC precipitated in bulk solution and AOT microemulsion ACC (AOT-ACC).



Supporting Information

Figure S4: IR spectra of (top) high pH ACC samples and (bottom) high conc ACC samples before and after heating. The samples were produced by heating at $10\text{ }^{\circ}\text{C min}^{-1}$ to either $70\text{ }^{\circ}\text{C}$ or $350\text{ }^{\circ}\text{C}$, followed by isothermal incubation at $70\text{ }^{\circ}\text{C}$ for 12 hours and $350\text{ }^{\circ}\text{C}$ for 3 hours, respectively. Both samples remained as ACC after heating at $70\text{ }^{\circ}\text{C}$, but crystallised to calcite after heating to $350\text{ }^{\circ}\text{C}$.



Supporting Information

Table S1: Raman peak broadening data for ACC precipitated in Na-AOT microemulsions (AOT-ACC), heat-treated AOT-ACC and control calcite samples. The ACC samples were all precipitated within microemulsions. A full width half maximum (FWHM) analysis on a Gaussian fit of the carbonate internal symmetric stretch peak at 1085 cm^{-1} shows a broadening of the peak with reduced crystallinity.

Sample	Product	FWHM Ratio $\times 10^4$
Unheated AOT-ACC	-	5370
Laser Heating	Vaterite	969
$1\text{ }^{\circ}\text{C min}^{-1}$ ramp rate to $70\text{ }^{\circ}\text{C}$, maintained for 12 hrs	Vaterite	548
$10\text{ }^{\circ}\text{C min}^{-1}$ ramp rate to $70\text{ }^{\circ}\text{C}$, maintained for 12 hrs	Calcite	26.2
Commercial Nanocalcite	-	24.5
Synthetic Calcite	-	7.73