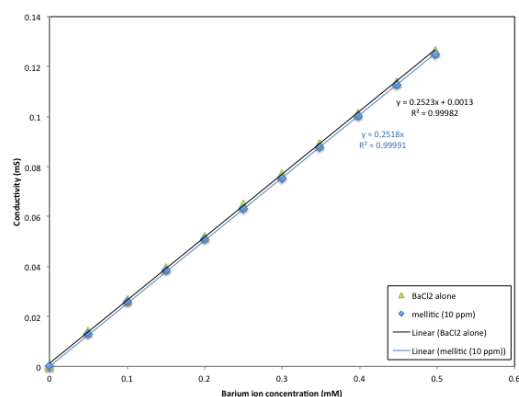


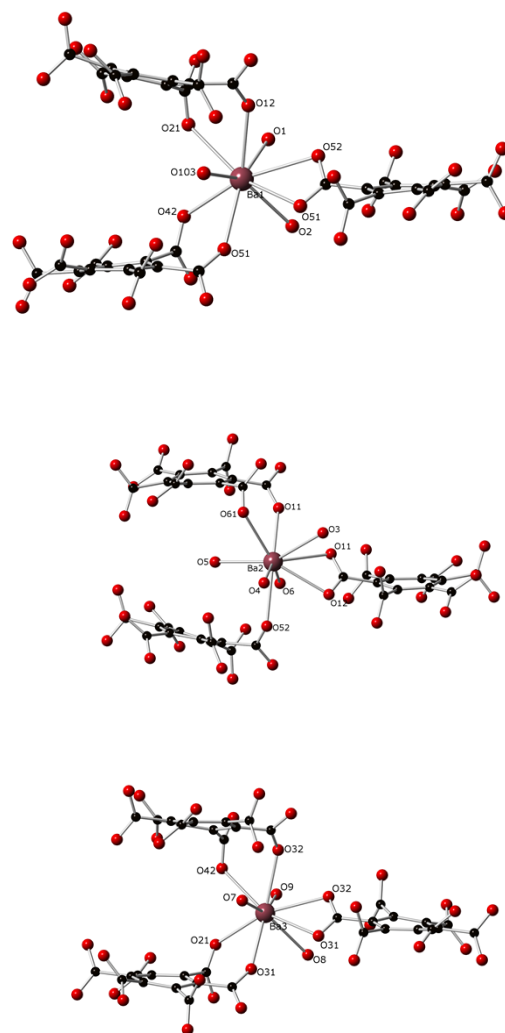
Supplementary Information

Morphological experiments – Description of method

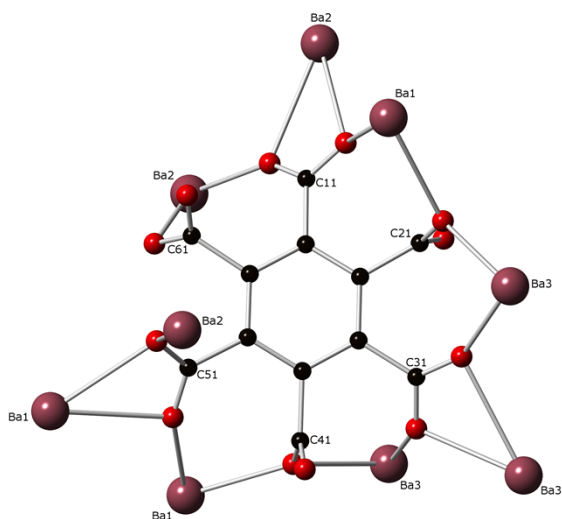
In a glass vial, a clean glass cover slip was added (to collect after 3 days and image using SEM). Water was added and then the required barium chloride stock solution (0.1 M, 50 μ L) was added to give a final concentration of 0.249 mM. The required mellitic acid stock solution (1000 ppm) was added to give the desired final concentration (the water volume was adjusted so the final volume remained the same) before a stoichiometric amount of sodium sulfate was added to give a final sulfate concentration of 0.249 mM. The vial was left for three days before removing the glass coverslip and the total volume was kept constant at 20.1 mL. These concentrations (of barium and sulfate) are equivalent to that used for the zeta potential measurements, previous conductivity measurements and the turbidity measurements and give an initial SI \sim 625.



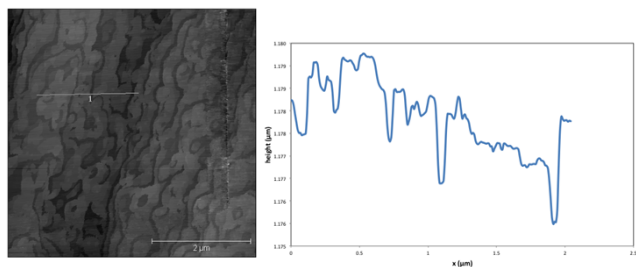
S1. Conductivity versus barium chloride concentration for pure barium chloride solution and barium chloride solution with 0.03 mM mellitic acid present at pH 6.



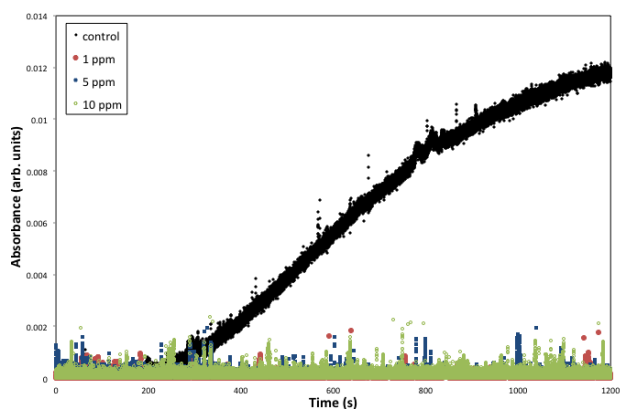
S2. The coordination environments about Ba1, Ba2 and Ba3 in the $[\text{Ba}_3(\text{mellitate})(\text{H}_2\text{O})_{10}]\cdot 4\text{H}_2\text{O}$ crystal structure.



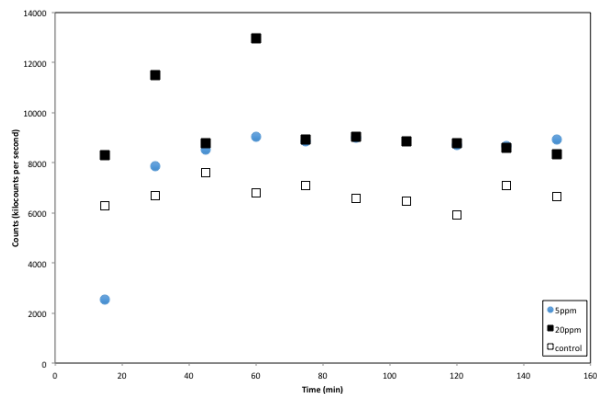
S3. The mellitate-Ba interactions found in the $[\text{Ba}_3(\text{mellitate})(\text{H}_2\text{O})_{10}]\cdot 4\text{H}_2\text{O}$ crystal structure.



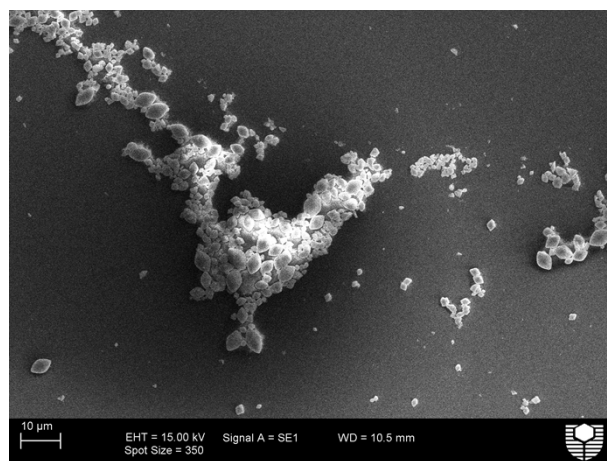
S4. AFM height image and measured heights of line 1 shown in the height image of the (001) baryte face growing in the presence of 0.0006 mM mellitic acid highlighting the surface roughness



S5. Turbidity versus time graphs for different mellitic acid concentrations



S6. Counts determined by DLS analysis of particles formed over time at different mellitic acid concentrations



S7. Aggregation of particles observed at 25 ppm (0.075 mM) mellitic acid after 3 days.