## Barite removal (and/or dissolution for isotope analysis)

The principle of the dissolution is an anion replacement reaction, where sulfate is replaced by carbonate in a weakly alkaline solution, forming acid-soluble sodium sulfate and barium carbonate. This is composited from the methods of:

*Breit, G.N., Simmons, E.C., Goldhaber, M.B., 2013. Dissolution of barite for the analysis of strontium isotopes and other chemical and isotopic variations using aqueous sodium carbonate. Chemical geology. Isotope geoscience section 52, 1–5. doi:10.1016/0168-9622(85)90043-0*

1. Thermally anneal your mineral separate prior to treatment, to makes sure zircon retains its closed system behavior during chemical attack.
2. Transfer up to 2 grams of sample into a 30 ml (tall) savillex vial, add 5 ml of 6M HCl, cap and agitate with the vortex mixer, and then flux on hot plate for an hour to dissolve any carbonate or phosphate.
3. Decant acid and rinse with 5X with a full vial of MQ H2O to remove any residual acid.
4. To the decanted sample add solid Na2CO3 in a ratio of approximate 10 parts Na2CO3 to 1 part sample. Fill the vial with MQ H2O, cap and agitate with the vortex mixer.
5. Place the savillex vial into a large Parr PTFE liner with 7 ml of water in the moat, and place in steel jacket in oven at 180°C for > 12 hours.
6. Remove the savillex vial from the Parr vessel, decant the solution, and rinse with 5X with a full vial of MQ H2O to remove any residual carbonate solution.
7. In small aliquots add 6M HCl and allow to react; continue to add 6M HCl until reaction is completed, then cap and flux on hot plate for an hour to dissolve any residual solids.
8. Decant acid and rinse with 5X with a full vial of MQ H2O to remove any residual acid.
9. The solid residue should be only silicates or oxides, including zircon.