

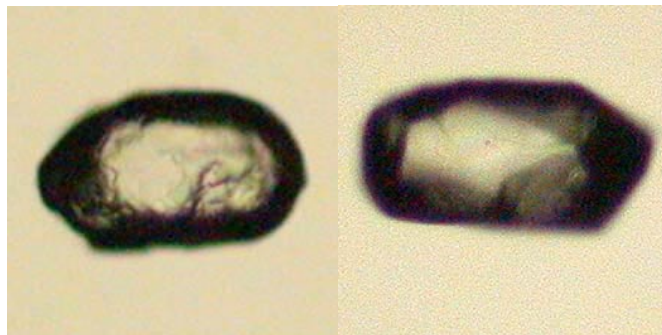
Hand-selection of Apatites for U-Th-He dating: Steph Briggs

Picking is done on the petrographic microscope with the digital camera attached, in the prep room, using glass slides and tweezers. Alternatively, one may be more comfortable initially picking on a watchglass or in ethanol at a binocular microscope, but eventually grains must be checked at a petrographic microscope under crossed polars. Because of the small size of apatite and the potential for contamination, it is important to keep things as clean as possible while picking apatites. Wear gloves and use your own pair of tweezers, which can be found at:

<http://www.2spi.com/catalog/tweezers/precision.html>

Using size 3 or 4 is recommended for the ease of picking. Before you start, clean off the tweezers either by poking them through a piece of filter paper or with a kimwipe and some ethanol. Also, clean off the entire bench and microscope area, using a small vacuum or wiping things down with a kimwipe in ethanol, and laying down paper beneath your work area to help with cleanup, which should also be rigorous. If you leave the room, protect your apatites by covering them with a little tent made out of creased weighing paper.

Starting with about 100 grains in a reasonable density sprinkled on a glass slide, a watch glass or in a petri dish of ethanol, select the best 10-15, and carefully transfer them to a clean glass slide. Ideal apatites should have no inclusions, no cracks, obvious facets & terminations, and be larger than 70 microns across. It is of utmost importance to have no inclusions. A single crack is not much of a complication, but avoid grains with networks of fractures. Try to have enough of the grain to be able to make out the original shape and estimate the percentage of grain missing, rather than a random fragment. If doing initial picking at a binocular microscope, also switch from transmitted to reflected light to view each grain once which can illuminate cloudy areas (likely inclusions).



Apatites are somewhat fragile, so rather than actually grasping with the tweezers, it may be easier to use static electricity to pick up grains. Scratch the tweezers across a clean slide lightly to build up a charge then touch a prong of the tweezers to a grain. Carefully move the grain to the other slide and touch it to the slide or another grain to release it. This is somewhat difficult and patience is a necessity.

Once you have 10-20 grains separated onto a slide, using the petrographic microscope go back to each grain inspecting it carefully under higher magnification for flaws, manipulating the grain if necessary to check for terminations, inclusions etc. Cross the polars and try to get the entire grain into extinction at once, checking for bright birefringent spots that are either inclusions or something on the surface of the grain. To differentiate between the two, carefully dab a small drop of ethanol onto the grain to clean off its surface. First check to make sure that the petrographic microscope is in alignment and adjust the condenser to get the most relief when looking at grains.

After picking you should take your best five grains and photograph them, using 10X or 5X (for very large grains) magnification and the completely telephoto setting on the digital camera. Now you are ready to transfer the grains to their platinum capsule. At this point you should fill out a helium sample sheet, with a correct, unique helium number assigned to each apatite.