	<b>SAMPLE PREPARATION MANUALS</b>	B. Heberer, I. Dunkl  26. 2. 2010
University of Göttingen	<b>Crystal selection for He dating</b>	Series editor: I. Dunkl

### **Picking & Packing manual for (U-Th)/He dating at the He-lab in Göttingen**

BEFORE you start working:



Keep things as clean as possible! Clean off the whole working area, i.e., the table, the microscopes, the tweezers, etc. with a Kimwipe and alcohol (poke tweezers through Kimwipe).

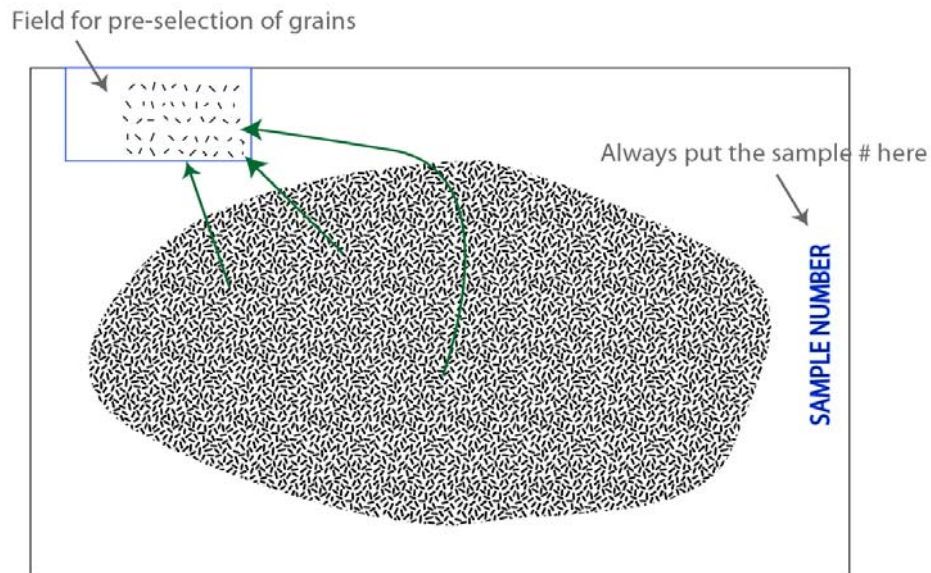
#### SELECTING & PACKING GRAINS

(A) Pre-Selection under binocular microscope:

Material: Labelled glass slide, binocular scope, tweezers (straight)

Sprinkle your grains in a loose single layer on a labelled clean glass slide where you marked a field for pre-selecting apatites on the upper left corner (Fig. 1). Lay the glass slide on a bigger glass plate.

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*Fig. 1: Glass slide with crystals for grain*

Use the Olympus binocular microscope (Fig. 2, left) to transfer a reasonable number of the most promising grains (depending on the quality of the crystals, experience ... between 10 and 50) to the field for pre-selection. Do not grasp the crystals with the tweezers (may break or jump off), but try to adhere them to the one of the tip of tweezers (gently touch the skin of your hand with the tweezers, if the crystals do not stick).

(B) Final Selection under petrographic microscope:

Material: Petrographic and binocular scope, digital camera attached to petrographic (OPTON) scope, sample sheet (Incapsulation list)

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*Fig. 2: Binocular microscopes. Left: Scope for pre-selection; Right: Scope for producing platinum capsules and transferring grains into capsules.*



*Fig. 3: Petrographic microscope for final selection.*



Carefully move the glass slide with the pre-selected crystals to the petrographic microscope (Fig. 3).

Now go back to each selected grain and inspect it carefully under higher magnification, using the criteria outlined below. Use transmitted, cross polarized and reflected light to check for inclusions!

Select the best grains (~3), go back to the binocular microscope and carefully align them next to the field of pre-selection. Try to turn them in order to show different prismatic faces upside.

Go back to the petrographic scope, which has a camera attached. Take a picture of each grain (start with the crystal on the right side and then move left – General rule: Always from left to right – but mirror-inversion at petrographic scope!). For photographs use the green objective (25x) and the 4x zoom of the small Canon camera. Turn the microscope table to align the grain parallel to the margin of the photograph.

Carefully fill out the sample sheet (Fig. 8)! Note topic, sample name, capsule (PtC for apatite = cleaned platinum capsules), Cry (number of x-tals), Photo file number, Date,

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Oper, Comments (0p, 1p or 2 p = number of pyramid planes; i = inclusions; broken; obl = obliquely broken, sm.i. = small inclusions; fl.i. = fluid inclusions).

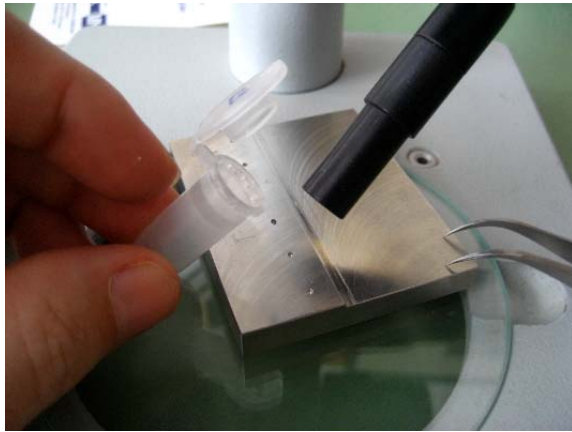
(C) Transferring the selected x-tals to the platinum capsules:

Material: binocular scope, sample sheet, 2 bent and 1 straight tweezers, planchet, platinum capsules, PE vials

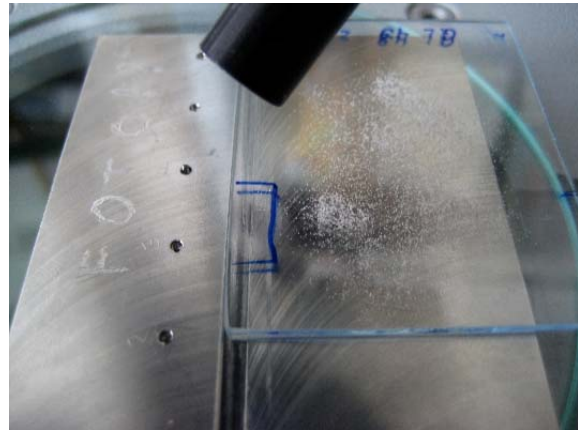
Take a clean platinum capsule (Fig. 7) for each selected crystal and place it into the small pits of the planchet.

Place the glass slide onto the planchet with the line of selected apatites in the immediate vicinity of the capsules to be filled (Fig. 4).

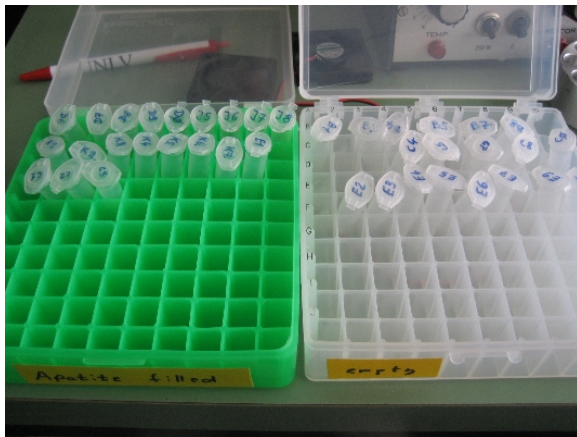
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*Fig. 5: Transfer of capsules into tubes.*





*Fig. 4: Setup for grain transfer.*



*Fig. 6: Storage boxes for empty and filled vials.*

Carefully transfer each crystal into a capsule. Start with the grain on the left hand side and work your way towards the right.

Check, whether the grains are really inside the capsules!

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Close the capsules: Grasp the capsule with the fine bent tweezers (as parallel to the lower rim as possible) and gently press it together. Do not make a wide suture. Use the second, more robust tweezers in addition for increasing the pressure in order to entirely close the capsule. The capsules should look similar to a „Maultasche“ (~pillow).

Choose empty, numbered PE vials (from the "Empty" box; Fig. 6), note the numbers on the sample sheet for each crystal and transfer the closed platinum capsules into the vials (Fig. 5).

Now the grains are ready for measurements!



Criteria for x-tal selection: Size (> 70 microns width)

No cracks – at least no network of fractures

Shape – Grains may be broken, but random fractures should not be picked. It should be possible to make out the original shape and to estimate how much of the original grain is missing.

No inclusions (probably hard to see at a binocular microscope – avoid grains that look „cloudy“ – Switch from transmitted to reflected light if possible. Final check for inclusions under crossed polars at petrographic scope!)

„Tools“ needed for grain picking and packing

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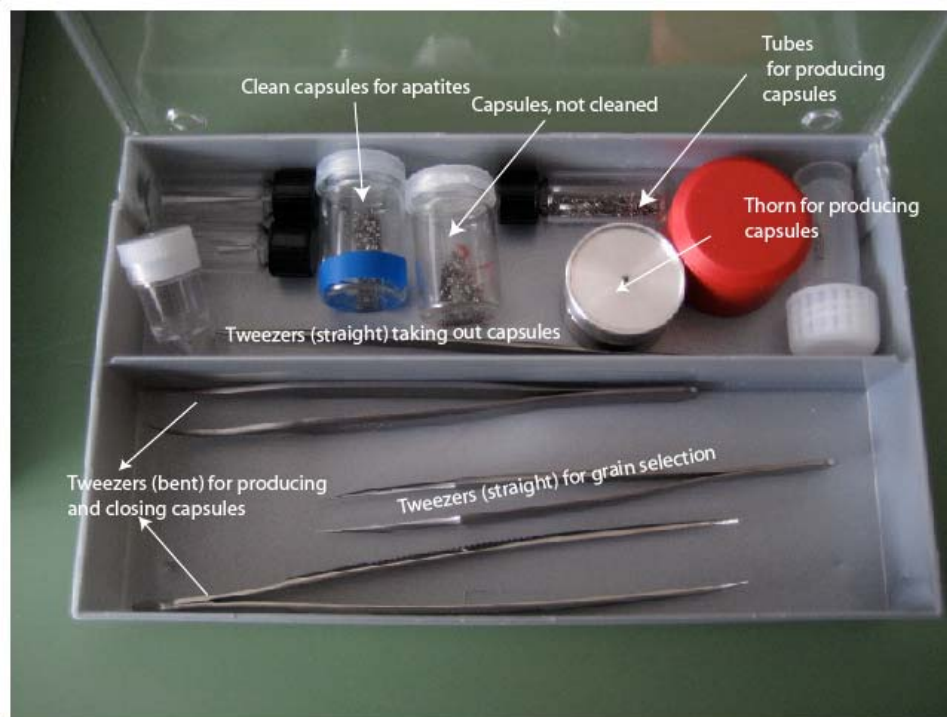


Fig. 7: „Göttingen toolbox“.



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