	SAMPLE PREPARATION MANUALS	T. Mikes 14. 4. 2016
University of Göttingen	Staining feldspars in thin section	Series editor: I. Dunkl	

Staining of thin-sections for feldspars

Getting started

- prepare uncovered thin sections leaving it a bit thicker (yellow quartz)
- polish with 600-grit SiC (may use finer powders, the finer the better)
- clean with dilute ethanol (to remove SiC rests, fat, dust etc.)
- read and sign security warning about HF usage (ask István for such)
- set up your staining facility near a sink; the beakers should have the appropriate size and shape to serve as chemical baths into which your thin sections will be dipped. Now prepare all the reagents except HF:

In a 100 ml beaker, solve 0.02 g K-rhodizonate in 60 ml distilled water.



In a 100 ml beaker, solve 4.4 g BaCl₂ in 80 ml distilled water.

In a 100 ml beaker, solve 36 g Na-cobaltinitrite in 60 ml distilled water.

- Fill a large (e.g. 500 or 1000 ml) beaker with distilled water and put it in the sink. (Water is used for rinsing the thin sections between the individual staining steps.) Allow a gentle stream of water to flow out of the tap which gradually replaces the water in the beaker. If possible, use distilled water.
- Set up lab wipes or paper towels with something to rest the sections against so that they dry on their edges rather than on flat sides.
- Finally, in the fume hood, prepare a bottle of HF (48 to 50%). Whenever working with HF, be very careful, calm and patient as it is extremely aggressive and toxic. Work only in the hood and keep all the security regulations.

Etching

- pour 48% HF into the etching vessel, with about 1 cm liquid height.
- close the vessel and place your section onto the aperture which has the appropriate size for your sections; take care that it fits precisely into the frame, leaving no leakage gap. (Fig. 1)
- never touch the section by hands; use a flat tweezers
- cover the dish with an upside-down plastic bowl to keep off air currents.
- etch for 45 sec; increase time if HF appears to attenuate (it remains strong for min. ~30 min.). The sections should never touch the HF liquid itself, only the vapour.

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Staining

- complete etching of all sections, and keep them in the fume before proceeding to stain. The etched surfaces should not get in contact with any object.
- drop a section into Na-cobaltinitrite solution; remove after 45 sec
- rinse thoroughly in distilled water
- shake off excess water and blot section edge with many-times folded lab wipes or paper towels
- dip the section into BaCl_2 solution, agitate shortly, remove after 2 sec
- rinse in distilled water, for 10 sec
- check whether there is a fine, thin, even water film covering the whole surface of the section
- place several drops of K-rhodizonate on the slide, in a very rapid succession. Help the solution distributing on the surface by agitating or tilting it gently
- after 3 sec (may vary upon plag composition), rinse in distilled water
- shake off excess water and blot section edge and dry gently with compressed air
- examine the plags with a microscope to determine whether they are sufficiently stained. If they are light grey/very light pink then cover briefly again with K-rhodizonate and rinse again. Always work with wetted surface and use short contact times (1-3 sec)

Covering

- cover just as the ordinary slides. Be careful; the stained surface is very fragile and fingers, and even water, could rub off the stain.



Some remarks

The role of reagents:

- Quartz remains unstained.
- Plagioclase will be stained by K-rhodizonate, turning them into pink.
- K-feldspar will be stained by Na-cobaltinitrite, turning them into yellow.
- BaCl_2 is needed between these two staining steps, for fixing.

Stability of reagents:

- K-rhodizonate: 1-2 hours max. Always prepare it freshly (pure crystalline material is hygroscopic, thus clumps tend to form. You may have to filter the solution first).
- Na-cobaltinitrite: about 6 months (after use, filter and keep in a brown bottle)

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- BaCl_2 : stable, but BaCO_3 may form and precipitate due to contact with CO_2 .

Intensity of staining:

- The K-rhodizonate stain may be too pale. If so, repeat staining as many times as desirable.
- If you have a fine-grained sample, (very fine sand, silt) the plagioclase stain tends to pervade the thin section and thus obscure some quartz grains.
- Staining intensity is proportional to An%; the more calcic the plag, the more stain it takes up. Pure Ab is not expected to take up the K-rhodizonate stain.

This compilation is largely based on:

Houghton, H. F. 1980. Refined techniques for staining plagioclase and alkali feldspars in thin section. *Journal of Sedimentary Petrology* **50**, 629-631.

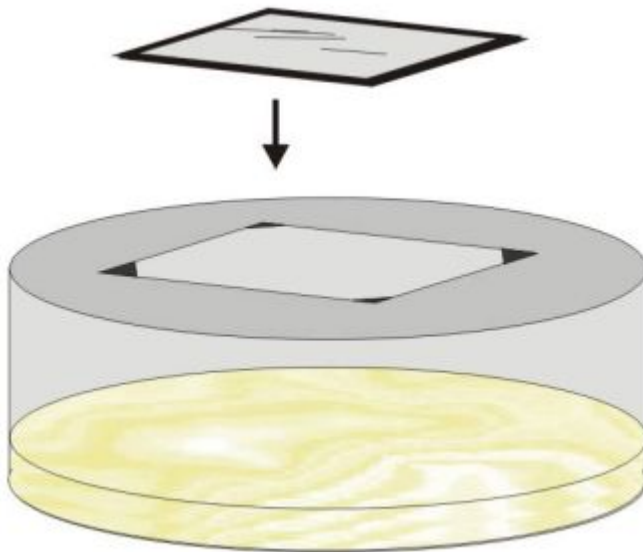


Fig. 1: Arrangement at etching.