Mineralogical Specimen Preparation

A Complete Range of Equipment and Consumables

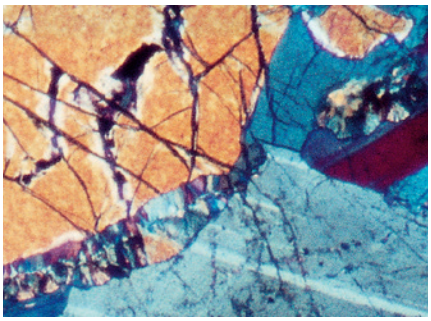
Struers' range of equipment and consumables for the preparation of mineralogical, geological and ceramic specimens covers the entire preparation process – from initial cutting to the finished thin section or polished section, ready for microscopic examination.

Struers' approach to mineralogy is based on four key points:

- A thoroughly tested method for the production of thin sections without the need of special skills
- Equipment that is easy to handle
- Cost-efficiency
- Environmental protection

The preparation of mineralogial, geological and ceramic specimens may be divided into two main groups:

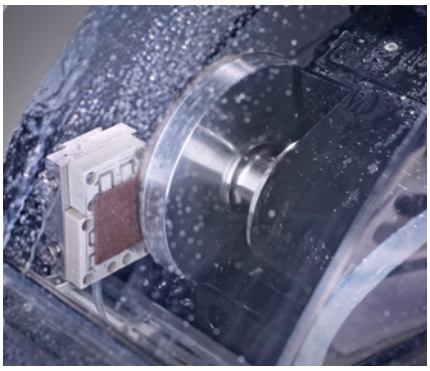
- Preparation of thin sections or polished thin sections for microscopic examination in transmitted or reflected light
- Preparation of specimens for microscopic examination in reflected light



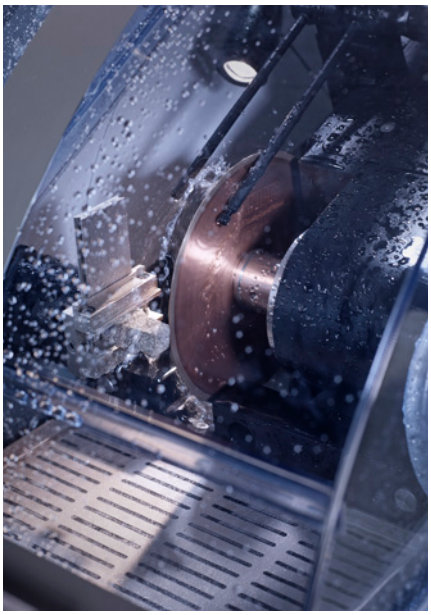
Thin Sections
The production of thin sections requires highly specialized equipment. Struers has developed the TS-Method™, a technique which provides outstanding quality and very high reproducibility - and it is very easy to use.

Polished Sections
The preparation of mineralogical specimens for microscopic examination in reflected light is basically similar to the preparation of other materials. After cutting, the specimens are normally mounted in the vacuum impregnation unit CitoVac using EpoFix resin. Lapping is carried out on LaboPol-30/LaboForce-Mi by means of a cast iron lapping disc and the composite disc MD-Largo. The abrasives used are SiC powder and diamonds. Grinding, lapping and polishing can also take place on either semi-automatic or automatic preparation equipment.

Accutom-100
World-class precision cutting and grinding table-top machine for delicate applications. Experience efficient precision sectioning with MultiCut allowing for up to 10 identical or different high quality slices in a single workflow combined with very accurate material removal control for perfect grinding planeness. A two-in-one solution for saving time and optimizing your inspection process for higher productivity with a quality output.



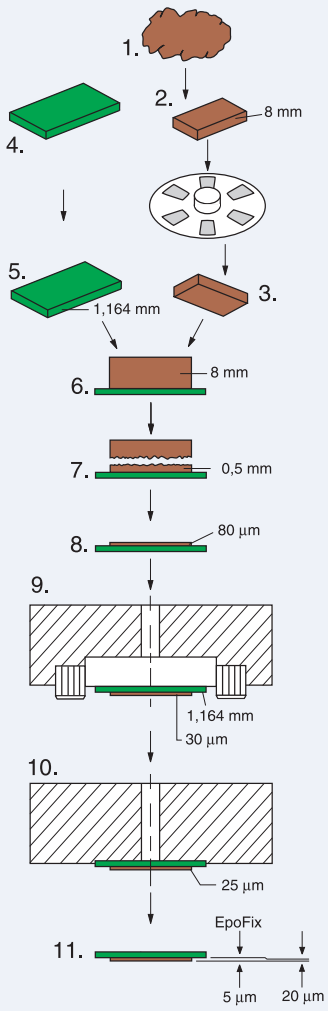
Grinding with cup-wheel on Accutom-100.



Cutting with Accutom-100

The TS-Method™ for preparation of thin sections

1. Sampling.
2. Cutting of a specimen on Accutom-100.
3. Automatic lapping of the specimen on LaboPol-30/LaboForce-Mi lapping/polishing machine.
4. Glass slide 27 x 46 mm or 28 x 48 mm.
5. Grinding of glass slide in Accutom-100 to a given thickness, e.g. 1.164 mm.
6. CitoVac vacuum impregnation unit: cementing of specimen to glass slide using EpoFix resin.
7. Accutom-100: cutting off surplus specimen material to a thickness of 0.5-2 mm.
8. Accutom-100: grinding of thin sections to a thickness of 80 µm (section + EpoFix resin).
9. Automatic lapping of thin section in BORTY thin section holder on LaboPol-30/LaboForce-Mi. Final thickness of section + resin e.g. 30 µm.
10. Automatic polishing of thin sections in TYNDS thin section holder on LaboPol-30/ LaboForce-Mi. Reduction for a typical polishing: approximately 10 µm.
11. The specimen is now finished. Thickness: 20 µm.



Outstanding precision

The glass slides are placed on ceramic vacuum holders and are then moved across a cup wheel with diamonds. The slides or specimens may be ground with an accuracy of ±2 µm in a couple of minutes. The ceramic vacuum holder allows for dressing of the cup wheel. This feature is important to ensure absolute precision.

Accutom-100 – precision cutting and grinding

For automatic preparation of thin sections the Accutom-100 can be used. Movement of the specimen is controlled automatically and positioning accuracy is 5 µm.

Polishing with TYNDS on Tegramin-30.

Automatic lapping and polishing of thin sections

Sections cut to a standard size on Accutom-100, are lapped automatically on LaboPol-30/LaboForce-Mi – up to eight sections at a time. Subsequently, they are glued to a glass slide, then cut and ground on Accutom-100.

LaboForce-Mi is a semi-automatic specimen mover for the production of thin sections, polished thin sections and polished specimens of mineralogical materials. The force is applied through springs which can be individually adjusted

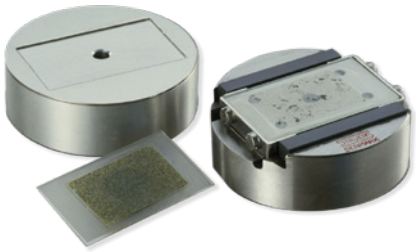
To achieve the final thickness (e.g. 20 µm), the sections are now lapped and polished on LaboPol-30/LaboForce-Mi: the specimens are placed either in a BORTY thin section holder for lapping or in a TYNDS thin section holder for polishing. Due to the automated preparation process the specimens are prepared with very high reproducibility.

Thin section holders

Thin section holders are indispensable tools in rational precision lapping and polishing of thin sections. Struers' thin section holders ensure plane specimens of perfect surface quality and well defined and uniform thickness.

Thin section holders for polishing

As diamond is used for polishing the thin sections, BORTY can not be used as diamond also removes material from the boron carbide sticks. Therefore a holder which does not touch the polishing cloth must be used. The TYNDS thin section holders are designed to solve this problem. They have the same outer dimensions as the BORTY holders. Consequently, they can be used on the same equipment with the same specimen mover disc that has already been used for precision lapping. The holders ensure excellent polishing.



Thin section holders for lapping and polishing

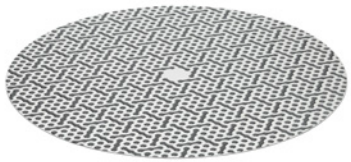
Precision lapping holders

The BORTY thin section holders are provided with very hard sticks of boron carbide (B_4C) which stop any further material removal when they make contact with the lapping disc.

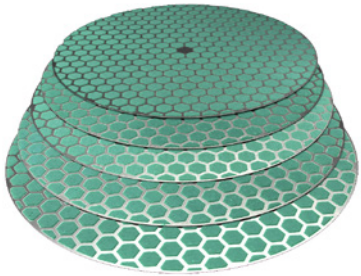
Preparation discs and lapping powders

Cast iron lapping disc
A cast iron disc (300 mm) for lapping is available. The disc is made of a special cast iron alloy which will resist long-term influence from SiC grains, regardless of grain size.

MD-Piano
For fast removal of material, grinding can be carried out using MD-Piano, a diamond grinding disc.



MD-Largo
MD-Largo is a composite disc for fine grinding. The special formulation of the composite material together with the use of diamonds as abrasive guarantees a uniform removal of material from different phases without smearing, deformation or chipping. The specimens will maintain a perfect planeness.

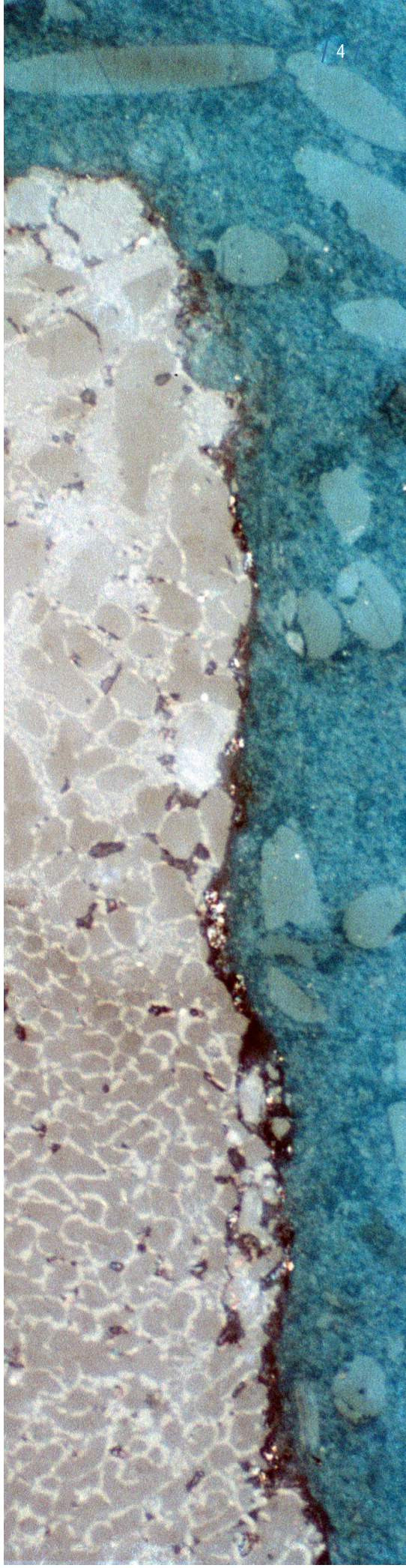


Lapping powders
Lapping on cast iron discs is carried out with SiC powder. A wide range of grain sizes is available.

CitoVac
CitoVac is a vacuum impregnation unit, especially designed for mounting and impregnating of porous materials. It is also very well suited for gluing specimens to glass slides for the production of thin sections.

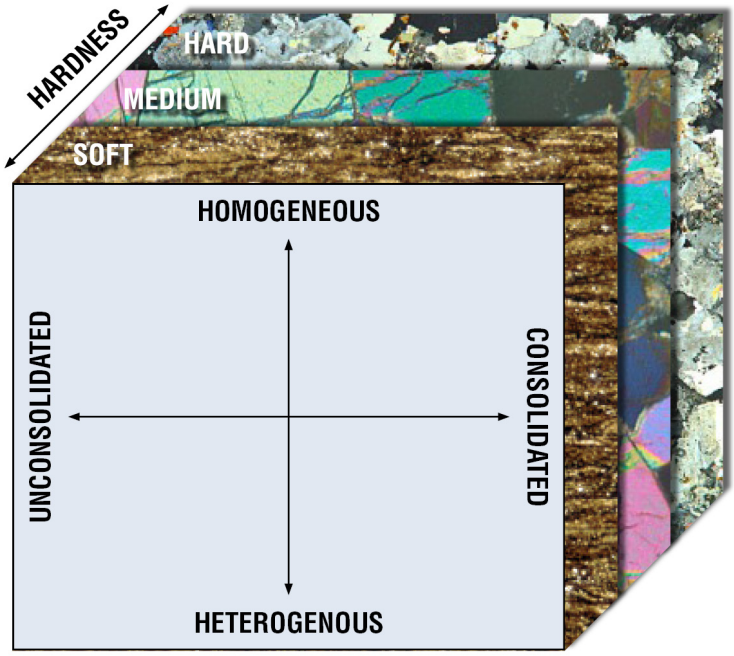
A special lid has to be used when gluing specimens to glass slides with the CitoVac.

Easy filling of mounting cups.



Mineralogy Methods Cube

Mineralogical specimens are often hard, brittle, porous, and inhomogeneous. They can contain extremely hard and soft phases that require accessories specially developed for these materials.



Struers Mineralogram – "Mineralogy Methods Cube"

The Methods Cube covers standard thin section preparation methods for a wide range of minerals. It was developed in collaboration with GEUS (The Geological Survey of Denmark and Greenland).

Want to know more?

Visualization of our Cube:

Along with GEUS, it was determined that a cube would provide the best representation of mineral properties. The cube is divided into three two-dimensional squares to make it easy to work with and understand.

The hardness of rock is a term that can be difficult to handle, because rocks are a kind of "composite" (and a mix of minerals with potentially different hardnesses). Important rock parameters, both alone and in combination with others, are internal structure (column equality, slate-like cleavage), and the extent to which the rock has been subject to pressure, and/or (partially) converted by various liquids or molten rock.

A rock may encounter isotropic properties that must be assessed for each specimen by looking at the mineral along with the general structure of the rock, and considering whether there are other conditions that may affect the hardness.

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Ensuring certainty

Materialographic preparation and testing demands consistent, reproducible results. These come not only from your laboratory process, operators and equipment, but from your supply chain and your partner. As a Struers customer you benefit from high quality design and engineering of equipment and consumables, but just as much from our unique knowledge base, robust global supply chain, and expert service and applications support – where and when you need it. We call all this ensuring certainty

Struers remains dedicated to making the world a better place through the pursuit of deep scientific insights and ground-breaking technology. Today, we're your trusted partner in a fast-changing world, sharing our expertise and practical experience on a global scale. This gives you innovative solutions that help you face the future with confidence. We continue to lead the way in materialographic products and services, and to shape future developments towards a better society.

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