

Nutzerordnung (kurz) Mikrosondenlabor des Instituts für Geologische Wissenschaften der Freien Universität Berlin

FU Geocampus, Malteserstr. 74-100, 12249 Berlin

Die Elektronenstrahlmikrosonde kann für qualitative und quantitative mikrochemische Analysen und Elementkartierungen von Feststoffen eingesetzt werden. Die Mikrosonde ist ausgerüstet für Elemente ab Ordnungszahl 11 (Na) in der energiedispersiven Analyse und ab Ordnungszahl 6 (C) in der wellenlängendispersiven Analyse. Für quantitative Anwendungen ist eine qualitativ hochwertige Politur notwendig, die in der Präparation des AB Mineralogie/Petrologie erstellt werden kann. Bitte fragen Sie im Zweifel beim Laborleiter um Rat.

Es können Proben bis 10 cm Kantenlänge gemessen werden. Am einfachsten ist der Umgang mit den Standardmaßen:

- nicht abgedeckter, polierter Dünnschliff (48 x 28 x 1 mm)
- polierte Rundprobe, \varnothing 25,4 mm (1 Zoll)

Die Proben müssen - sofern es sich nicht um elektrisch leitfähige Materialien handelt - vor der Untersuchung mit Kohlenstoff bedampft werden. Die notwendigen Apparaturen stehen in den Labors des AB Mineralogie/Petrologie zur Verfügung. Alle Benutzer müssen ihre Bedampfungsvorgänge im Benutzerbuch eintragen. Jeder fünfte Benutzer muss den Glaszylinder/Probentisch der Bedampfungsanlage von der anhaftenden Kohlenstoffschicht befreien. Markierungen sollten, wenn nötig, zuvor auf der zu untersuchenden Oberfläche aufgebracht werden. An der Mikrosonde steht keine Durchlichtoptik zur Verfügung.

Messtermine werden mit dem Laborleiter abgesprochen. Der Laborleiter trägt die Messtermine in einen digitalen Kalender ein, den auch Mitarbeiter einsehen können. Diese Mitarbeiter können Messtermine nur selbständig vereinbaren, wenn sie der Laborleiter (z. B. wegen Abwesenheit) dazu vorher autorisiert hat.

Kosten:

- Institutsangehörige 250 € / Tag
- Gäste von wissenschaftlichen Institutionen 300 € / Tag
- Gäste aus wirtschaftlich operierenden Betrieben (Servicebetrieb) 100 € / Stunde

Für kleinere wissenschaftliche Aufgaben ist auch eine stundenweise anteilige Abrechnung vereinbar. Bei wissenschaftlich orientierten Anliegen wird vorausgesetzt, dass die Anwender nach Einweisung weitgehend selbständig arbeiten können. Ist diese Voraussetzung nicht gegeben, behält sich das Labor die zusätzliche Rechnungsstellung von Arbeitskosten (30 € pro Stunde) vor. Für Kunden aus wirtschaftlich operierenden Betrieben ist die Arbeitszeit in den Nutzungskosten inbegriffen.

**Prize list (short) of the electron microprobe lab of the AB Mineralogy-Petrology
(Freie Universität Berlin)**

FU Geocampus, Malteserstr. 74-100, 12249 Berlin

The electron microprobe can be used for qualitative and quantitative microchemical analyses and element distribution maps of solid samples.

Prizes:

- Members of the Institute of Geological Sciences 250 € / day
- Guests from scientific institutions 300 € / day
- Commercial/Industrial rate 100 € / hour

Prizes for commercial/industrial purposes include all analytical activities by staff members. For scientific questions it is desirable for users to conduct their analytical activities independently. If a user is not able to conduct their analytical activities independently after the comprehensive training provided by the laboratory staff, supervision will be invoiced with 30 € / hour.

Berlin, 01.03.2021

Dr. Moritz Liesegang (head of EPMA lab)

Terms and Conditions for accessing the electron microprobe laboratory at AB Mineralogy-Petrology (FUB)

The electron microprobe laboratory is part of the AB Mineralogy-Petrology at the Freie Universität Berlin. The laboratory is to conduct research by providing scientific advice and laboratory infrastructure. The present user regulation is binding for all users of the microprobe laboratory. By using our facility, you agree to the following points:

1. Laboratory equipment

The task of the microprobe laboratory of the AB Mineralogy-Petrology is to enable measurements with the electron microprobe. The laboratory is currently equipped with a:

- JEOL electron microprobe JXA 8200
- Carbon coater Leica EM SCD 500
- Transmitted polarized light microscope
- Reflected light microscope

The devices are available to users for the processing of their research questions, as is the other laboratory infrastructure.

2. Access to the microprobe laboratory

All scientists wishing to use our facility need to contact the head of the microprobe laboratory. The head of the laboratory will endeavor to provide short term measurement times. Appointment requests are processed in the order of their arrival. In the case of an urgent need to carry out measurements, the laboratory staff may decide to revoke assigned measuring dates and to assign them to other users.

Analytical time can be canceled by the laboratory staff if the laboratory is not ready for use due to, e.g., technical defects or personnel bottlenecks. The allocation of substitute dates for canceled analytical time is preferably carried out against regular appointments. If a user cannot perceive an appointment in the laboratory, one has to cancel the appointment at least two working days beforehand. If one does not comply with this obligation, the laboratory time will still be invoiced if the appointment cannot be assigned otherwise in the short term.

3. Sample requirements and preparation

Size of samples

Nearly any solid material can be analyzed. In most cases, samples are prepared as 28 x 48 mm rectangular thin sections without cover slips or 1-inch mounts. Thick sections up to 1 mm are also okay.

Polishing

The most critical step prior to sample analysis is a fine polish so that surface imperfections do not interfere with electron-sample interactions. This is particularly important for samples containing minerals with different hardness; polishing should yield a flat surface of uniform smoothness.

Petrographic work and coating

Having the thin section or mount ready, petrographic work on a microscope should be done prior to the use of the EPMA. Prior to analysis, samples have to be coated with a thin film of carbon by means of evaporative deposition. Carbon coating should be done with the Leica EM SCD 500 at the AB Mineralogy-Petrology to make sure that the coating layer thickness is similar to that of the reference material.

4. Carrying out measurements and support for the user

The extent to which laboratory users are assisted in carrying out analyses by the laboratory staff depends on the complexity of the analysis and the knowledge of the equipment of the users. In principle, it is desirable for users to conduct their analytical activities independently. In order to learn how to operate the device, it is not enough to have attended a student seminar on microanalysis. An on-site personal instruction into the microprobe by the laboratory staff and several hours of on-site training are a prerequisite to run the facility independently. Measurements for less extensive research projects, which would not justify a comprehensive training, can be carried out together with the laboratory staff.

The user is supervised by the laboratory staff for a maximum of seven hours per day. Within this period, all work requiring the presence of the laboratory personnel must be completed. The period of time in which users can access the care of the laboratory staff extends from Monday to Friday (working days) between 9 AM and 4 PM.

Extended on-site analytical time might be possible but needs to be discussed with the laboratory staff. A decision is case-sensitive. These regulations are not affected by measurements for pre-stored analyses. Valid in every case: at the beginning of the new work day of another user and at the end of booked lab time, the measurements must be completed.

5. General behavior in the microprobe laboratory

The user has to follow the instructions of the laboratory staff and has to deal carefully with all laboratory equipment. If damage to the laboratory equipment is caused by faulty operation or negligence of the user, the damage must be remedied timely by the user.

Installing your own software on the computers of the laboratory is strictly forbidden. The copying of software from the laboratory computers is strictly prohibited. Modifying configuration files, initialization files, and start-up routines on the laboratory computers is strictly forbidden. Any violation of the User Regulations, Laboratory Regulations, or Occupational Health and Safety Regulations may lead to permanent exclusion from the laboratory use.

6. Liability

The AB Mineralogy-Petrology continually strives to provide high-quality data. Nonetheless, the AB Mineralogy-Petrology shall not be held liable in the event that results from our facility are subject of subsequent revision. Furthermore, we will not be held responsible for samples lost in transit. The AB Mineralogy-Petrology shall not be responsible to the user for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, provided such damage was not caused by a willful act.

7. Data protection

The users of the microprobe laboratory commit themselves to data protection. Data from other users, which are stored on the laboratory computers, may not be evaluated, copied or published. The primary/raw data obtained in the laboratory (e.g. measurement data, calibration values) are archived on the UNIX microprobe computer. However, this does not release users from their obligation to safe their own data in an appropriate and timely way.

8. Charging structure and publishing of data

Running an electron microprobe lab is an expensive proposition. User fees directly support the operation of the lab and help keep the instrument an open resource to researchers and the scientific community. We strive to keep the user access fees for the instrument reasonable and competitive with the fees for similar laboratories at other institutions. The price for each analytical day depends on the time necessary to carry out the envisaged measurements and on the necessity for personal support from the laboratory staff. We offer daily analytical time because pre- and post-analytical work has always to be done. However, small, very well-defined scientific projects can be charged per hour. The user fees charged daily can be

provided upon request (please contact the head of the lab). If a user is not able to conduct their analytical activities independently after the comprehensive training provided by the laboratory staff, supervision will be invoiced.

Unless otherwise agreed between a user and the laboratory staff, the data obtained in the microprobe laboratory will be used by the user for at least one peer-reviewed manuscript to appear in the scientific literature. Manuscripts which are to be submitted for publications should be sent to the laboratory staff in a timely manner. The staff member will review the microprobe component and recommend any points where improvements might be made. In each case of publication, the laboratory has to be mentioned:

- In the case of independent lab work by the user without any scientific contribution of the laboratory staff, the microprobe laboratory is to be mentioned in the acknowledgment of the publication.
- If a user is not able to conduct their analytical activities independently or the laboratory head contributed scientifically to the work (e.g. by developing analytical routines or by a significant evaluation of data), the work may be considered a scientific collaboration.

In case of a scientific collaboration and unless otherwise agreed between a user and the laboratory staff, the head of the laboratory (or staff member) could be considered as a co-author. The qualification for co-authorship should be based on the following criteria (adapted from McNutt et al., 2018, PNAS; <https://doi.org/10.1073/pnas.1715374115>):

The co-author is expected to have made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work; or have drafted the work or substantively revised it

AND to have approved the submitted version (and any substantially modified version that involves the author's contribution to the study);

AND to have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

Microprobe lab members who meet less than the above criteria for authorship should not be listed as authors, but they should be acknowledged. In both cases, a copy of the publication (in electronic or printed form) must be made available to the laboratory staff.

9. Preparation of the sample(s) prior to any microprobe analyses

The user is responsible for a proper preparation of his/her analytical time. This means that one needs to make sure that:

- the sample(s) fit to our sample holder
- the sample(s) are well polished and have a flat and even surface
- the user knows and documented the/their sample(s) by using other methods, for example, light microscopy.
- the samples should be coated before the analytical day (to save time).

If any of the above-mentioned point cannot be provided by the user, the AB Mineralogy-Petrology shall not be made responsible for any analytical day terminating without conducted measurements. The price of an analytical day is independent of the achieved goals.

Berlin, 01.03.2021

Dr. Moritz Liesegang (head of EPMA lab)

Recognition of User Regulations

I hereby confirm that I have read and understood the terms and conditions for the use of the microprobe laboratory at the AB Mineralogy-Petrology of the Freie Universität Berlin. I acknowledge all rights and obligations arising out of this User Regulations by my signature.

Family name

Surname

Affiliation (Name of Institute / Company, Street, Postcode, City)

Phone

Email

Berlin,

Signature.....