

Laboratory for Electron Probe Microanalysis

University of Vienna

Faculty of Earth Sciences, Geography and Astronomy
Department of Lithospheric Research

Infrastructure

CAMECA SX Five Electron Probe Microanalyzer

The electron probe microanalyzer is equipped with a field emission cathode and with five crystal spectrometers for high precision spatially resolved elemental analysis on polished surfaces of solids. In addition, the instrument features an energy dispersive analysis system (EDX) for rapid semi-quantitative elemental analysis.

Organization

The instrument is primarily intended to serve the research interests of the Earth Science subunits and is also used in research-guided teaching. A course for users is held once a year. Access to the lab is available to external users through research collaborations with researchers from the Earth Science subunits.

Personnell in charge of organization of the microprobe laboratory and responsible for the maintenance and upkeep of the infrastructure:

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Dr. Elena Petrishcheva	phone: ++43-1-4277-53445 email: elena.petrishcheva@univie.ac.at
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Organization of laboratory operations CAMECA SX Five

Structure: Functions - Competencies – Responsibilities

Function	Competencies	Functions- Responsibility
Laboratory Director	Laboratory equipment	Control of laboratory operation Representation towards the University of Vienna and outside
	Financial management	§27 Project management
Laboratory Manager	Coordination of user appointments	Guarantee of efficient laboratory operation
	Application of all methods	Organization of access for users, guidance and support of users ¹
	Method development	Training courses for internal and external users
Operator	Technical equipment support	Support of users during instrument operation, services ¹
	Application of all methods	
	Method development	Maintenance and service of the device

¹Services of lab manager/operator: in case of significant scientific or methodological input, participation in publications (co-authorship) is expected

Personnell

Function	Person
Laboratory Director	ABART Rainer
Laboratory Manager	PETRISHCHEVA Elena
Operator	KIRALY Franz

Organization of laboratory operation CAMECA SX Five

Average annual expenditure on consumables

Consumables EPMA				
Position	Kosten/Einheit	#/Jahr	Kosten/Jahr	
FEG Source	10000	0,50	5.000,00 €	
Service oil free backing pump	3000	0,75	2.250,00 €	
Apertures	800	1,00	800,00 €	
Penning tube cleaning/replacement	3000	0,50	1.500,00 €	
Column cleaning (small)	3000	0,75	2.250,00 €	
Column cleaning (big)	5000	0,33	1.650,00 €	
Storage boxes	100	3,00	300,00 €	
Cleanroom gloves	10	25,00	250,00 €	
Cleaning cloths	108	0,50	54,00 €	
Compressed air spray	116,16	1,00	116,16 €	
Nitrogen 50 l bottle rental	3,54	12,00	42,48 €	
Nitrogen gas	25	1,00	25,00 €	
Counting gas P10 50 l bottle rental	3,54	12,00	42,48 €	
Counting gas P10	75	1,25	93,75 €	
Ethanol 5l	21,48	2,00	42,96 €	
Propanol ultrapure 5l	49	2,00	98,00 €	
Coating material (Carbon rods)	50	2,00	100,00 €	
Service ordinary backing pumps	300	1,00	300,00 €	
Sum consumables			14.914,83 €	

Finanzing

The above values are based on past experience. Should the actual costs for consumables as well as the utilization of the equipment develop significantly different from the expectations, adjustments of the operating costs will be necessary. The user fees serve exclusively to cover the running operating costs and part of the repairs for the microprobe laboratory and the associated infrastructure (vapor deposition system) and are only valid for use by employees of the University of Vienna and their cooperation partners in the context of scientific research.

For users who are members of the University of Vienna, this results in a daily rate of 300 € for the use of the EPMA Lab. Users who do not belong to the University of Vienna will be charged an additional overhead of 25%.

EPMA (150 days)	300 € / EPMA day²	
100 working days ordinary use		30.000 € / year
50 days reserved for service/teaching		

USER REGULATION

Measurement date

A measurement day is divided into three slots: 9:00-13:00, 13:00-17:00, 17:00-9:00 of the following day. The smallest bookable time unit is one slot, a working day includes 3 slots (24 hour shifts). The arrangement of a measurement appointment is made with

Dr. Elena Petrishcheva, Tel. ++43-1-4277-53445
email: elena.petrishcheva@univie.ac.at.

The appointment is binding. An inability to attend must be announced at least three working days before the scheduled measurement date. Repeated unjustified absence from an agreed measurement appointment or unjustified postponements at short notice may lead to exclusion from laboratory operation by the laboratory management. An agreed date can be cancelled or postponed by the laboratory management, if unforeseen disturbances occur in laboratory operation.

Sample preparation

Specimen dimensions

The following specimen formats can be accommodated by the standard specimen holders:

- (1) polished thin section measuring 48 x 28 x 1 mm.
 - (2) polished round specimen, in synthetic resin or on glass slide \varnothing 25 mm
- Other specimen formats may be possible by individual arrangement.

Specimen condition

A perfect polish and minimal relief are indispensable prerequisites for quantitative analysis. Polished sections should not be thinner than 30 μ m to avoid fluorescence radiation from the glass slide.

Samples must be coated with an electrically conductive surface layer. For this purpose, the sample is coated with a 15-20 nm thick carbon layer. It is important for the quality of the carbon coating that the samples are absolutely clean, free of grease and dust, and dry when handed in for carbon coating. After carbon coating, the samples must be manipulated only with laboratory gloves and must be stored dry in dust-free containers. Any contamination by fingerprints must be avoided.

Navigation on the specimen

For navigation on the specimen, it is recommended that a picture of the entire specimen is taken (scan or macro photo - preferably before final cleaning and carbon coating). For orientation in the area of interest it is recommended to take reflected and transmitted light images. Reflected light images bear the closest resemblance to electron-optical images and are therefore the most suitable for navigation purposes. Ideally, both transmitted and reflected light images should be prepared.

Preparation of the measurement campaign

Preliminary information to laboratory technician/operator

Contact must be made with the laboratory manager or operator at least three working days before the planned measurement date. At this time at the latest, it is clarified who will be the operator for the planned measurement campaign.

The following information must be transported at this time at the latest:

- (1) type, number, and dimensions of the samples
- (2) Analytical tasks: e.g. point analyses, images, ...
- (3) Elements to be analysed

Analysis results, data transfer, publication

The laboratory manager/operator transmits the measurement results in electronic form as soon as possible after the measurement date. In case of significant scientific contribution by the laboratory manager/operator, co-authorship is expected in case of publication. The service of the laboratory is to be stated in any case in the Acknowledgements of a publication as follows: "EPMA analyses were made at the laboratory for electron probe microanalysis of the Faculty of Geosciences, Geography and Astronomy at the University of Vienna (Austria)."

Vienna 11.7.2022

Univ.-Prof. Mag. Dr. Rainer Abart