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Department of Geological Sciences  
Electron Microbeam Laboratory  
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Lab Manager  
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## Request to use the EPMA/ESEM/SEM

### **Purpose of this Form**

All users interested in using the electron microprobe (JEOL 8200 EPMA), the environmental scanning electron microscope (FEI XL30 ESEM), *and/or* the scanning electron microscope (JEOL 6490LV SEM) must complete this form. The purpose of this form is to inform the lab manager of the goals of your research project and your intended use of the instrument(s). Because the lab guarantees high-quality data, all users must provide as much information about their samples as possible before the lab manager will allow time on the instrument(s). The form needs to be completed and submitted only once per project. A new form must be submitted before beginning another project.

This form also serves as an agreement between the lab manager, the user(s), and the account holder/faculty advisor. A signature by the primary user and the person responsible for payment is required. By signing this form, the user and account holder/advisor agree to the terms posted below regarding data quality, interpretation of data, instrument down-time, payment, and instrument instructions and training (page 2).

*Data quality:* For quantitative data generated on the EPMA, secondary standards are analyzed before, during, and after acquisition of a user's samples to monitor the quality of quantitative (standardized) compositional data generated during a shift. Totals within 1.5% point of the expected total are considered acceptable (i.e. if 100% desired, 98.5% to 101.5% considered acceptable). Standardized, quantitative data is not generated on the ESEM/SEM. Therefore, all data generated on the ESEM/SEM is considered acceptable. Users may consult with the lab manager BEFORE USING THE INSTRUMENT to discuss optimal instrument parameters for the research proposed in this form.

*Interpretation of data:* The lab manager is not responsible for the interpretation of data. Users may consult with the lab manager to discuss analytical statistics.

*Instrument down-time:* Time on the instrument will not be charged if the instrument malfunctions during a scheduled shift. If the lab manager can fix the instrument within one (1) hour, the user will be charged for the entire shift. If the malfunction cannot be fixed within one (1) hour, the lab manager will work with the user to reschedule time on the instrument.

*Payment:* Invoices for instrument usage are billed promptly. Users and account holders/advisors (if applicable) are responsible for rapid confirmation of charges and billing information. Users and account holders/advisors are also responsible for providing the lab manager with up-to-date billing information.

*Instrument training and instructions:* All users must be trained before using the instrument. Users must follow the instructions provided during training and in the operation manual. Any user caught not following instructions will be asked to leave the lab.

## **User Information**

Name of Primary User: \_\_\_\_\_

Dept.&Group (internal users) or University/Company (external users):

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Position (internal users only): \_\_\_\_\_  
(undergraduate, graduate, postdoc, researcher, faculty)

### Contact information

*Email (required):* \_\_\_\_\_

*Advisor/Account holder email (required):* \_\_\_\_\_

*User phone/cell # (required):* \_\_\_\_\_

Describe your level of experience (circle one)

*Novice/Inexperienced:* You have either never taken an electron microscopy course or have taken such a course but have not used an electron microprobe in over 1 year. A novice user would need extensive assistance.

*Intermediate:* You have taken an electron microscopy course, have used the electron microprobe at UT, and/or have used an electron microprobe elsewhere. A user with intermediate experience would have at least 2 years of hands-on experience using an electron microprobe. A user that has intermediate experience would need some assistance from the lab manager or lab assistant.

*Expert:* You are proficient with the use and maintenance of electron microprobes (this requires years of experience). An expert user would not need the assistance of the lab manager or lab assistant.

Type of use desired (circle one)

*Independent:* Requires permission from the lab manager. A short-course is offered by the lab manager for those researchers that are not familiar with the electron microprobe and wish to become an independent user. Note that independent users are not provided with 24/7 access to the facility. Independent users must conduct all work during business hours (8AM to 5PM, M-F).

*Assisted:* The lab manager or lab assistant will help setup the instrument, collect and assess data on standards, and train the user how to analyze the unknowns (samples).

*Immediate Need:* Should an immediate need of the instrument arise, users should add 'URGENT' to the title of the proposal (i.e. URGENT: [Title]). The reason for the immediate need should be described in the project abstract. It is up to the discretion of the lab manager to approve or deny any request for immediate instrument usage.

**Billing Information**

Method of payment (circle one):      Check              Wire transfer              UT account number

UT account # (if applicable): \_\_\_\_\_

Name of account (if applicable): \_\_\_\_\_

Billing address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Project Information**

Project Title:

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Provide brief, focused description of the project including goals of the project (3-5 sentences):

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Which instrument is being requested (circle one or multiple)?

JEOL 8200 EPMA

FEI XL30 ESEM

JEOL6490LV SEM

Type of analysis (see options below; multiple types of analysis can be selected):

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*Qualitative/Semi-Quantitative analysis:* Need to identify minerals/phases, but do not need standardized compositions.

*BSE/SE/CL imaging:* Need electron images of samples. (CL on ESEM only)

*Qualitative X-ray element maps:* Relative distribution of elements in an area **WITHOUT** standardized compositional information.

*Quantitative X-ray element maps:* Relative distribution of elements in an area **WITH** standardized compositional information. (EPMA only)

*Quantitative analysis:* Need standardized compositional data for one, or more, phases. (EPMA only)

*EBSD:* Identification of minerals using crystallographic data. (ESEM only)

Describe the sample(s):

(see below for required descriptors; users are encouraged to describe samples in more detail)

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*Type:* thin section, epoxy mount/round, grain mount.

The JEOL 8200 EPMA can hold a maximum of 4 (four) polished thin sections, 1 (one) 2x3" polished thin section, 2 (two) 1<sup>3</sup>/<sub>4</sub>" rounds, 2 (two) 1<sup>1</sup>/<sub>2</sub>" rounds, or 6 (six) 1" rounds. The FEI XL30 ESEM can hold a maximum of 2 (two) thin sections, 1 (one) 2x3" polished thin section, three (3) 1" aluminum SEM stubs, or seven (7) 1/4" aluminum SEM stubs. The JEOL 6490 LV can hold a maximum of two (2) polished thin sections, one (1) 2x3" polished thin section, three (3) 1" aluminum SEM stubs, or seven (7) 1/4" aluminum SEM stubs. A combination of each type of mount can also be accommodated; contact the lab manager to consult about sample holders and specimen requirements.

*Number of samples:* How many samples will be examined? How many of each type?

*Polish:* An excellent polish and flat surface are required for quantitative analyses. An excellent polish and flat surface are required for cathodoluminescence imaging. Though not required, a polished surface improves the compositional resolution of BSE images and X-ray maps. Samples will be inspected before they are loaded into the instrument. Samples that need to be polished and are not adequately polished will not be loaded into the instrument; the user will be required to polish of all samples during their scheduled instrument time (you will be charged for this time). The quality of the polish is subject to discrimination of the lab manager.

*Coat:* A carbon coat is not required for all samples. A carbon coat is recommended, but not required, for samples that will be X-ray mapped (ESEM and SEM only). A carbon coat is required for all samples in the EPMA. Users should contact the lab manager at least 2 days before their session to have samples coated. If samples are not coated on the day of your shift, the lab manager will coat all samples, but at the expense of time on the instrument (you will be charged for this time).

*Vacuum mode (ESEM/SEM):* Specify high- or low-vacuum mode. Note that samples MUST be coated for high-vacuum mode.

*Peltier cooled sample stage (ESEM only):* Will the cooling stage be needed? If so, explain why.

*Low-vacuum detectors (ESEM only):* List the low-vacuum detectors you want to use. Explain your choices. You may use the literature in the lab, use the lab's webpage, or consult with the lab manager to determine which detectors you need.





**Analytical Setup – EPMA (ESEM/SEM users may skip this section)**

All users should consult with the lab manager regarding analytical setup. This portion of the form can be completed with the lab manager, if needed. Instrument usage may be denied if the lab manager does not approve of the analytical setup requested in this form.

- \*A list of all standards is available on the lab’s webpage ([www.jsg.utexas.edu/microbeam/](http://www.jsg.utexas.edu/microbeam/)).
- \*The compositions of all available standards can be found in the lab or on the lab’s webpage.
- \*Available diffraction crystals in each spectrometer are listed on the lab’s webpage.
- \*Background offsets for quantitative analyses can be determined for most elements using software (Virtual WDS) in the lab.
- \*Under certain circumstances, the user will be required to perform wavescans to determine offset positions (this time will be billed).

1) List the minerals/materials to be analyzed: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2) How will background X-ray intensities be accounted for (circle one)?

Background offsets (common)      Mean Atomic Number (MAN)      Other

3) How will background offsets be determined, if applicable (circle one)?

Virtual WDS (Z>9)      Wavescans (Z<9)

4) List the standards needed/wanted (Appendix 1), including the elements in each standard:

- Standard #: \_\_\_\_\_ Element(s): \_\_\_\_\_
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Use the space provided for additional comments regarding analytical setup. Use this space to explain how you plan to correct for background intensities, if you chose 'other' above.

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**Scheduling Information**

Please indicate the amount of time needed to complete the project. Multiple shifts/days can be reserved with approval of the lab manager. Will the instrument be needed infrequently over a long period of time to complete the project?

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By signing this form, you (the user and advisor/account holder) agree to use the instrument only for the purposes described above.

Signature of user: \_\_\_\_\_

Date: \_\_\_\_\_

Approved by: \_\_\_\_\_  
(signature of advisor or account holder)

Date: \_\_\_\_\_

Appendix 1  
Electron Microbeam Standard Database

UT Std. #	Std. Name	Elements	UT Std. #	Std. Name	Elements
T1	An-glass	Ca,Al,Si	T115	Zircon	Zr,Si
T4	An50Ab50 glass	Ca,Na,Al,Si	T119	Zircon - 91500	Zr,Si
T6	Orthoclase	K,Al,Si	T151	USNM REE phosphate	La,P
T19	P140 Olivine	Mg,Si	T152	USNM REE phosphate	Ce,P
T20	Kakanui hbl	Ca,Mg,Fe,Al,Si	T153	USNM REE phosphate	Pr,P
T23	Benitoite	Ba,Ti,Si	T154	USNM REE phosphate	Nd,P
T36	Anorthite	Ca,Na,Al,Si	T155	USNM REE phosphate	Sm,P
T39	Fayalite	Fe,Si	T156	USNM REE phosphate	Eu,P
T40	Grossular (P127)	Ca,Al,Si	T157	USNM REE phosphate	Gd,P
T41	Amelia albite (P24)	Na,Al,Si	T158	USNM REE phosphate	Tb,P
T42	Spessartine (P130)	Mn,Al,Si	T159	USNM REE phosphate	Dy,P
T43	Pyrope (P384)	Mg,Al,Si	T160	USNM REE phosphate	Ho,P
T45	Anorthoclase	Na,K,Al,Si	T161	USNM REE phosphate	Er,P
T59	Rhodonite	Mn,Si	T162	USNM REE phosphate	Tm,P
T60	Apatite	Ca,P,F	T163	USNM REE phosphate	Yb,P
T61	Syn. Ni <sub>2</sub> SiO <sub>4</sub>	Ni,Si	T164	USNM REE phosphate	Lu,P
T64	Dolomite USNM	Ca,Mg,C	T165	USNM REE phosphate	Y,P
T66	Siderite USNM 2460	Fe,C	T166	USNM REE phosphate	Sc,P
T68	Chromite 531M-8	Fe,Cr	T204	Utah Topaz	Al,Si,F
T75	Ilmenite	Fe,Ti	T208	Apatite APS-21	Ca,P,F,Cl
T77	Scapolite	Na,Ca,Al,Si,Cl,C	T209	Apatite APS-27	Ca,P,F,Cl
T86	Syn. TiO <sub>2</sub>	Ti	T210	Apatite APS-36	Ca,P,F,Cl
T94	Cr-Augite	Ca,Mg,Si	T211	Apatite APS-26	Ca,P,F,Cl
T95	F-phlogopite	K,Mg,Al,Si,F	T212	Apatite APS-20	Ca,P,F,Cl
T105	Diopside	Ca,Mg,Si			
T109	Hornblende	Ca,Mg,Fe,Al,Si			
T110	Labradorite	Ca,Na,Al,Si			
T112	Olivine	Fe,Mg,Si			
T113	Pyrope	Mg,Al,Si			
T114	Quartz	Si			