

Training and Access for New Users of the JEOL JEM-2100F

1. A three-session, one-on-one training by the TEM facility staff, with each session about 2-4 hours (depending on situation). Users who satisfactorily complete the training will be granted C-Access to the lab. At this stage, users can reserve sessions on-line, and use the instrument under supervision, but do not have access to the lab doors.
2. After at least three additional practice sessions, with each session at least 2-3 hours, plus passing a quick check list with lab manager, B-Access will be granted. At this stage, users can reserve sessions on-line, use the instrument independently, and have daytime access to the lab doors (8:00 am – 5:00 pm) Monday-Friday.
3. Users who have accumulated at least additional 30 hours experience with the instrument after B-Access, plus emergency procedure training, will be promoted to A-Access, which allows users to access the lab in a 24/7 scheme.

During training, instrument and staff training labor rates will be charged.

Basic Training

1. A brief introduction to the lab, which includes sample and sample holder storage, liquid nitrogen, sample holders etc. A brief discussion on the samples that trainees will study will be conducted, which is helpful to guide the direction of training.
2. A brief introduction to the transmission electron microscope, which includes: (i) interaction between electron and materials; (ii) diffraction and image formation; (iii) the three major apertures and their roles in transmission electron microscopy; (iv) vacuum conditions; (v) functions on panels and their relation with the real action of electron beam controls;
3. Sample loading and unloading by using single tilt-holder and double-tilt holders. Practice for several times.
4. Beam alignment and the purpose of the specific alignments: (i) condenser lens alignment; (ii) alignment between different beam size; (iii) eucentric height adjustment; (iv) pivot alignment; (v) current center and high-tension center alignment; (vi) objective astigmatism correction. Practice for several times.
5. Digital camera, data transfer and storage.
6. Shut down procedure of the instrument.

Advanced Training

The basic three-session training will allow students to start working with the instruments. Once basic operation training is finished, more dedicated trainings will be available on request.

Imaging Techniques	Bright field, dark field, and high angle annular darkfield
Series Tilting Technique	Double tilt holder – obtaining and controlling the imaging condition
Convergent-beam electron diffraction	
Phase Contrast	FFT, Scherzer focus
EDS	Experimental condition set-up, peak identification, qualitative and quantitative analysis, elemental mapping, line scans
STEM	Free-lens control, Ronchigram, HAADF imaging, aperture alignment, coma correction, astigmatism correction
EELS	Zero-loss collection and alignment, optimization of the condition, edges of elements and collection, sample thickness
GIF	GIF tuning, energy filtered imaging

Periodic supplementary training also includes workshops and presentations by invited faculty members and application scientists from the major manufacturers, and some vendors with very special techniques.