

**Tender notification for the procurement of a Scanning Electron
Microscope (SEM) with Cathodoluminescence at IISc.(Last date for
submission of tenders: July 20, 2016)**

Dear Sir/Madam,

Kindly send your best quotation for the following item on C.I.P Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, E.D., payment terms etc. The tender should be submitted in two separate sealed envelopes- one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 17.00 hours July 20, 2016.

Please send your Performa Invoice valid for at least 90 days for supply of the following goods along with your terms and conditions and other vital information as required by us.

Please enclose a compliance certificate along with the technical bid.

Specification of the product:

Scanning Electron Microscope (SEM) system with the following minimum specifications:

- Pre-centered Tungsten and LaB₆/or similar filament source with accelerating voltage up to 30KV.
- Electron gun should be fully automatic.
- Maximum probe current of at least 1μA or more.
- High precision zoom condenser lens.
- Provision of accurate measurement of probe current with minimum resolution of 1pA- 1 μA or more.
- Fully automatic chamber evacuation system.
- Magnification should be at least 300000 times.
- A minimum image resolution in high vacuum at least 3.0 nm at 30 KV (SED), 4 nm at 30 KV (BSE), 8.0 nm at 3 KV (SE) accelerating voltage.
- Eucentric sample stage with 5-axes motorized motion – minimum stage motion in X and Y axis should be 100 mm or more.
- Minimum chamber size for housing the sample 270mm.
- Minimum sample stage size 100mm X 100 mm.
- Specimen stage at least X=Y= 100 mm (motorized) z= 60 mm, Tilt 70° to -5°.
- Tilt eucentric at all working distances (360° rotation) for sample areas mounted at an appropriate distance from the stage based.

- Sample holders for single and multiple stubs.
- Geological/natural mineral oxide standards and pure metal standards.
- Secondary Electron Detector.
- Back Scattered Electron detector.
- A cathodoluminescence detector (panchromatic CL or higher) attached to SEM

Panchromatic Cathodoluminescence Imaging System

CL Specifications:

- The CL detector should be compact and miniature type and provide panchromatic CL images.
- Wavelength range 185 – 850 nm.
- When inserted should position close to the sample.
- Easily retractable up to 100 mm.

Live Color Cathodoluminescence Imaging System

Live color CL-Specifications:

- The system should provide colour- cathodoluminescence (CL) images in a single scan of the electron beam i.e. simultaneous acquisition of red, green and blue cathodoluminescence colours
- Ability to observe colour CL images live.
- Chamber mounted detector featuring retractable, detachable, diamond –turned parabolic mirror.
- Light collection solid angle should be $>1.4 \text{ Pi}$ steradian
- Spectral response range from ≤ 400 to ≥ 800 nm.
- Should include integrated back scattered electron detector, allowing simultaneous detection of colour CL, backscattered electron and secondary electron images.
- Grating optics providing light dispersion onto high gain array detector.
- Should be able to acquire and display red, blue and green raw signals as well as the full-colour image.
- Advanced digital beam control system, which includes 4 TTL pulse detection electronics and 2 x high bit depth analogue inputs for simultaneous detection of SEM signals.
- Must be able to acquire colour CL and secondary electron images simultaneously with up to 8000 x 8000 pixels.
- Must include all the electronic equipment (including computer monitor and printer) and software necessary for the operation of the detector, capture of the live colour images, post-capture processing, presentation and saving of the image data.

- Sample holder - Standard specimen holder for standard thin-section samples (4.8 X 2.8 cm), specimen holders for mounted circular sample and for standards. Specimen holder should be large with solid flat top.
- Image mode should be – secondary electron image, reflection image, back scattered image (composition, topography and stereoscopic image) and cathodoluminescence. Minimum pixel quality must be specified.
- Ability to take back scattered image and cathodoluminescence image together.
- Appropriate kit of sample holders for SEM imaging.
- Appropriate high vacuum system for SEM operation.
- UPS system for at least 30 min-3 hours power back up with stabilizer for handling power fluctuation.
- EDS- Dry silicon drift detector, EDS should have a minimum area of 10mm². It should be LN2 free EDS, SDD or any other equivalent type. Detection limit should be from B to U or more. Should include mapping software as standard and a Co / Mn Standard sample. Resolution should be 129 ev or better.
- Appropriate chiller and air compressor for SEM operation.
- Desired features - safety measures, auto contrast, auto focus, auto stigma, auto gun alignment and biasing, maintenance videos, click center zoom, frame step move, saving position coordinate, custom icon, seamless auto bias.
- Spare availability – The supply of spares is guaranteed for 7 years from the date of first AMC contact.
- Operation table
- Chamber scope
- Load lock chamber (Optional).
- Plasma cleaner for decontamination of the chamber (Optional item).

Software and operational requirements:

- System should be capable of doing 3D data analysis as standard.
- Quantitative, Qualitative, Line analysis, Mapping programs
- Quantitative Mapping program.
- Complete package of software to effectively manage and operate the system should be included.
- OS should be latest/new version.
- Appropriate Image editing software, language should be English.
- Appropriate settings for minimize noise.
- Touch screen.
- Appropriate hardware and software for image storage and analysis.
- Facility for printing images.
- Stage navigation system.

The stage control software includes standard facilities for:

- Store and recall of unlimited sample positions.
- Double-click feature select function.
- Drag-and-zoom functionality to center and zoom in on a selected area.
- Stage navigation based on a pre-recorded image.
- Sample navigation automated system, which creates a sample-image-map of large samples. This map can be used to display a montage of images for a large field of view and for easy navigation.

Terms and Conditions:

- Consumables including filaments and spare parts/maintenance kit for three years.
- The vendor should have at least 5-installation track record of having previously supplied similar equipment in India (please furnish the details) for similar institutions.
- The vendor should have qualified technical service personal for the equipment based in India (preferably in Bangalore).
- The payment will be through confirmed irrevocable letter of credit 80% on shipping 20% after installation and acceptance.
- **Payment Terms:** Details of Payment terms will be negotiated with the lowest bidder.

Warranty requirements

- Quote warranty for 1, 3 and 5 years separately.
- Warranty must include a yearly overhaul.
- AMC rates including yearly overhaul after warranty for 1, 3 and 5 years must be included separately.
- Indicate price for AMC

Other requirements

- Please specify the training and operational plans for running the equipment.
- Quotation should carry proper certificates like agency certificate, preparatory certificate, etc.
- The indenter reserves the right to with hold procurement of final order. The right to reject or all split up the requirement or relax any or all of the above conditions without assuring any realer.
- If the goods are focused to be defective, they have to be replaced/rectified at the cost of the suppliers within 15 days from the date of receipt of written communication from us. If there is any delay in replacement/rectification, the warranty period should be correspondingly extended.

ACCEPTANCE

The supplier shall indicate acceptance standards for the instrument after installation at the Indian Institute of Science including, but not limited to, the following

- a) Stability of electron beam current over reasonable time periods, e.g., to be demonstrated through a large area elemental mapping for ~12 hrs, in small pixel size.
- b) Accuracy of natural mineral (geological sample) quantitative analysis after standardization using geological standards must be satisfactorily demonstrated on a mutually agreed sample. The mineral formulae recalculation (Cation Stoichiometry) of the weight percentage values must match satisfactorily with ideal chemical composition of the sample.
- c) After calibration using geological standards, a precise analysis of secondary standards (provided by us) must be carried out to demonstrate accuracy and error free calibration in EDS level.
- d) Satisfactory demonstration and operational training for the entire application component after installation.
- e) Images: BSE, CL, SEM and Topo images must be of acceptable high-quality at various magnification. Geological samples provided by us must be used to demonstrate the image quality.

Please note following points at the time of sending your quotation.

- 1) Please quote the best price for FOB/CIF, Bangalore separately as per above specification.
- 2) Details of all taxes and duties must be clearly specified.
- 3) We are exempted from excise duty. Excise duty certificate will be provided by us.
- 4) We will also provide custom duty exemption certificate.
- 5) Please indicate the delivery terms clearly.
- 6) The quote should be valid up to 90 days.
- 7) Insurance should be covered from your warehouse to Indian Institute of Science warehouse.
- 8) Terms of payments should be clearly specified.
- 9) Please indicate country of origin of the material being supplied.
- 10) Last date for submission of the document is **July 20, 2016; 5.00 PM**
- 11) Submit your Performa Invoice to

**The Chairman
Centre for Earth Sciences
Indian Institute of Science
Bangalore 560 012, INDIA
Phone: 080-2293-3405**

Yours Sincerely,

Prof. Sajeed Krishnan (On behalf of the purchase committee)
Associate Professor
Centre for Earth Sciences
Bangalore, 560012.