

Tender Notification for the procurement of **high resolution FESEM with EDS and EBSD attachments** at IISc
(Last Date for submission of tenders: 6th September 2019)

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 1700 hours 6th September 2019.

Please enclose a compliance certificate along with the technical bid.

Technical specifications for the high resolution FESEM with EDS and EBSD attachments

Sl. no	Features	Specification	Compliance
1	Resolution	0.7 nm or better @15 kV in high vacuum 1.1 nm or better @ 500 V in high vacuum	
2	Electron Gun	High Stability Schottky Field Emission Electron Source with automated filament cutoff safety device	
3	Magnification	Lower mag. ×30 or less Higher Mag. ×1,000,000 or more	
4	High Tension	Lower limit: 20V, Higher limit: 30 kV and any chosen intermediate value. All the kV settings should be varied through software	
5	Chamber	a) Chamber should have at least 7 accessory ports, b) Integrated plasma cleaner, c) Infrared chamber scope (IRCCD) for real time view	
6	Stage	5 axis motorized eucentric stage with X and Y of 100 mm or more and Z-axis = 20 mm or more, Tilt = -3° to +70° or better. Manual Joystick as well as software control for stage movement	
7	Sample holder	a) SEM should be able to handle at least 50 mm wafer; b) Multiple sample holder to be provided which accommodates different varying sample sizes in the range 1 mm to 20 mm or larger c) sample holder for STEM imaging	

8	Electron Optics, Lenses	The system must have magnetic/electrostatic objective/compound lens or equivalent lens assembly for high resolution imaging of ferromagnetic and other materials with working distance of 2 mm or less. The lenses should be thermally stabilized. Electron channeling contrast imaging (ECCI) should be possible with the supplied optics	
9	Lens correction	Astigmatism, wobbling, aberration correction etc. should be controllable through software as well as manual control panel for proper adjustment of focusing.	
10	Probe Current	Adjustable range from Minimum: 3pA or less and Maximum 100nA or higher Noise < 1%, Drift < 0.2%/hour	
11	Detectors	Secondary electron (SE) imaging detector or equivalent. In-lens SE detector or equivalent for high resolution imaging in high vacuum. Pneumatically retractable backscattered detector and pneumatically retractable STEM detector for BF / DF and HAADF imaging	
12	User Interface	Computer controlled user friendly interface for the smooth routine operation of microscope	
13	Display computer and software	A computer system with 24 inch or more display with latest Windows OS and all the necessary supporting software to run the FESEM and all the other accessories. The software should have function like auto-focusing, drift correction, dynamic focus, auto-contrast/brightness etc.	
14	EDS-EBSD-TKD Detectors	<p>The state of the art EDS-EBSD-TKD system should be fully integrated and should work on the same User Interface and should consist of the following:</p> <p><u>EDS detector:</u> Should be easily retractable to a safe position when not in use. Peltier cooled silicon drift detector (SDD) with pulse processor, Active detector area 30mm² or larger, energy resolution of 125eV or better at Mn K alpha. Detection of elements down to Beryllium and quantification from Boron onwards, Robust EDS detector window with Silicon nitride.</p> <p><u>EBSD-TKD sample holder and detector:</u> 70° Pre-tilted sample holder (2 nos.) for EBSD and suitable holder TKD Camera Speed: 1500 or higher indexed patterns per second on Ni standard at beam currents of > 2 nA, Motorized, high-precision camera slide, Touch sensor for collision prevention, Integrated Real (not virtual) Forward Scatter Detector, SEM interface for</p>	

		camera should contain standard features	
15	EDS Software	<p>Qualitative and quantitative spectrum analysis for accurate peak identification, background subtraction and automatic peak evaluation</p> <p>Deconvolution of spectra for separate element contributions</p> <p>Quantification software must have options for ZAF or similar corrections</p> <p>User interactive qualitative and standardless quantification with K, L, M, N line database. Quantification of elements from Boron in point, Line Scan, Mapping. Real time elemental mapping with auto elemental identification, quantification based on ZAF or similar correction algorithms. Quantification of phases.</p> <p>Spectral imaging with up to 4096 x 4096 pixel resolution, online deconvolution and pseudo color mapping. Storing of spectrums at each point during mapping for online and offline analysis (1 offline license).</p> <p>Display of quantitative results as atomic and weight percentage. Color-coded concentration distributions (element maps, phase maps) for any number of elements within an arbitrary field of view.</p> <p>EBSD-TKD data collection software include state of the art features. EBSD-TKD data analysis software (with 3 offline licenses) should include state of the art features for grain size, phase, orientation, mis-orientation and texture analysis. Should have suitable materials databases for metals, alloys, intermetallics, ceramics and polymers.</p> <p>Export of results to MS® Word, Excel and pdf.</p>	
16	Calibration standard samples	Standard samples to be provided for SEM-EDS-EBSD-TKD	
17	Essential Accessories	<p>a) Vibration and noise free chiller</p> <p>b) Compressor for pneumatic systems of the microscope</p>	
18	Power supply :	All equipment should operate with 220 V, 50 Hz power supply	
19	Warranty	Warranty (from the date of full installation) for 5 years along with free software upgrades for the entire system including all the attachments	
20	Documentation	Vendor should specify the model number of the FESEM and submit the brochure that supports all the quoted specifications	
21	Operation &	Soft copy of the operation & maintenance manuals should be provided	

	maintenance manuals		
22	Availability of spares parts	The vendor has to guarantee that all the spares parts for the offered FESEM and attachments will be available for at least next 10 years	
23	Installation & training	Onsite installation, demonstration of all specifications quoted. Training for 5 persons in the operation of the FESEM-ECCI-EDS-EBSD for 5 days	
24	Pre-installation requirement (civil & electrical EMI and gas, etc.)	Should be mentioned along with offer. Free survey of vibration and EMI at site and provide the results of the survey and the necessary modifications if required for achieving best results	
25	Optional Accessories	Vibration isolation system, EMI active cancellation system, Suitable UPS for 1 hour of back up	

Mandatory requirement:

Testing of the samples supplied by us to validate the specifications with respect to electron channeling contrast imaging. The above testing process is to be made accessible for the end user in person or through skype or similar web based application. It may be noted that the decision to open the financial bids will be based on the test results.

NOTE / Pre-Qualification criteria:

- A) Equipment offered must be a model from the current serial production range of the manufacturer. Customized or One off Manufactured Model will not be accepted. Offer should be supported with printed catalogue / depiction on company website.
- B) The local vendor of OEM must have supplied at least 10 FESEMs to IITs, IISERs and other Govt. of India organizations. Please attach a reference list of supplies in last 2 year with contact details (Name, Phone, email address) of users.
- C) The company or companies (for combined quotations) should be original equipment manufacturers (OEMs) of the FESEM-EDS-EBSD systems. Please attach exclusive authorization certificate(s) specific for this tender with quote without which bid will be rejected.
- D) The manufacturer must be an ISO9001 company & equipment model must be with CE compliance. Please attach relevant certificates.

Terms and Conditions

1. Two bid system (separate technical and financial bids) in sealed tenders
2. The technical bid must clearly specify the prescribed technical specifications without including the prices. Vendors who include price information in the technical bids will be automatically disqualified.
3. Technical bids will be opened first. IISc may seek clarifications after opening of technical bids, and may ask them to perform in a short time (1 week) some example experiments with their set up on the sample given by IISc to demonstrate the promised technical specifications. Vendors may be required to give presentations. There are several items that require information to be provided by the supplier. If information is not provided against any of these items, this will disqualify the supplier. After technical evaluation by a committee, vendors may be asked to re-quote in a specific format to facilitate comparison of prices. IISc also reserves the right to cancel the tender at any time without assigning any reason whatsoever.
4. Price bids of only technically qualified vendors will be considered and the vendors will be informed the day of opening the price bids.
5. The price bids must offer CIF Bangalore prices.
6. Prices to be quoted separately for baseline system and options. Prices will should be quoted in adequate detail with relation to packing details to cover insurance compensation in case of damage to any specific modules
7. Indicate separately price of spares listed above in terms of unit cost. The price of these spares will be included in the price comparison. Any additional spares recommended by the company will be considered for ordering but not included in the comparison. The buyer reserves the right to make the final decision on ordered spares
8. Indicate price for annual maintenance contract.
9. The payment will be by letter of credit: payable 80% on shipping, 20% after satisfactory installation and acceptance.
10. Indicate Delivery period.
11. Order will be placed on lowest bid from technically qualified vendor.

➤ The tender documents can be sent at the following address:

Dr. Satyam Suwas
Professor
Department of Materials Engineering
Indian Institute of Science, Bangalore 560012
Karnataka (INDIA)