

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
2A & 2B Raja S.C.Mullick Road, Jadavpur, Kolkata 700032

Tender Notice No. : IACS/CSS/FESEM/2017-18/107 Dated 16-02-2018

Sub : Procurement of “Field Emission Scanning Electron Microscope (FE-SEM)”

Sealed tenders in a two-bid system (**Technical Bid & Price bid**) are invited from bonafide, resourceful and eligible manufacturers/exclusive distributors of “Field Emission Scanning Electron Microscope”.

Part I (Technical Bid) of the tender should contain technical details and commercial terms and conditions and Part II (Price Bid) should indicate group-wise price as mentioned in the Technical Bid where applicable. The Technical Bid and Price bid are to be submitted in two separately sealed envelopes distinctly marked accordingly and both to be put inside another envelope, which should be sealed and super-scribed with tender notice number and due date. The bidders may submit bids duly signed in their own letterheads.

Complete tender bids should reach the office of the **Department of Central Scientific Services, Indian Association for the Cultivation of Science, 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata- 700032** or on before the scheduled date & time specified below.

Tender Notice Number	IACS/CSS/FESEM/2017-18/107 Dated 16-02-2018
Last date and time of submitting tender	15/03/2018 at 3.00 PM
Pre bid meeting to discuss on technical specifications	22/02/2018 at 3.00 PM
Date and time of opening Technical bids	15/03/2018 at 4.00 PM
Place of opening Technical bids	CSS Department
Place of Opening Tender	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their e-mail addresses. The rest of the bids will be rejected.
Contact details	Prof. P. Dastidar, Department of Organic Chemistry, IACS, Phone- ocpd@iacs.res.in

The technical bids will be opened first to evaluate the technical specifications of the equipment. It will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by technical evaluation team. Thereafter, the Price bids of only technically qualified bidders will be opened. The date of opening the Price Bids will be intimated to the short-listed bidders at their contact address. The rest of the bids will be rejected.

(A) TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as ‘TECHNICAL BID’ on the outer cover of the envelop as already detailed above.

Technical Specification of Field Emission Scanning Electron Microscope (FE-SEM)

Considering the use for a wide range of samples such as conducting, non-conducting samples in the form of organic, inorganic, crystals, thin films, polymers, biological samples etc. of micro to nanoscale dimensions from different research groups for specialized work on this important facility, the Instrument must satisfy the following technical specification:

Sr N.	Features	Specifications
	Resolution	SE mode : 1 nm or better @ 15 kV and 1.5 nm or better @ 1 kV The definition of resolution and the method used to determine the same should be specified. At lower kV high resolution support should be maintained with proper hardware / technology. Documented authentication has to be provided. Resolution has to be demonstrated after installation of the system with samples, according to the specifications.
	Magnification	25X to 10,00,000X or better. Minimum magnification should be specified.
	Accelerating voltage	≤ 0.1 to 30 kV continuously adjustable
	Electron gun	Schottky field emitter with 12 months guarantee at average 8-10 hours working per day.
	Probe current	100 nA or higher
	Electron Optics	Beam Deceleration/Gentle Beam/Beam Booster technology or equivalent for high resolution imaging at low kV. Optics should have appropriate measures to analyze magnetic materials at high magnifications. Documented authentication has to be provided.
	Detectors	❖ In lens/in column SE ❖ In-chamber SED (Everhart-Thornley) ❖ In-lens BSE/ Angle Selective BSE/ Equivalent Technology ❖ Energy filtering technology should be built-in with capability of simultaneous acquisition and display of images ❖ Detector should have capability of high sensitivity for low kV analysis ❖ Specify built-in automatic/ manual control for contrast and brightness
	Chamber	❖ Large chamber with at least 6 or more accessory ports. ❖ Chamber air-lock design for changing of the specimens quickly. ❖ Chamber should be equipped with an IR-CCD camera or any suitable device to view the sample & stage inside the analysis chamber.
	Anti-Contamination Trap	The SEM must be equipped with an anti-contamination trap/plasma cleaner or equivalent technology.
	Specimen Stage	PC and manual with joystick or trackball controlled 5 axis motorized stage with motorized stage movements ▪ X =70 mm or more

		▪ Y =50 mm or more ▪ Z =35 mm or more ▪ Tilt = ≥ -3 to $\geq 70^\circ$ or better ▪ R = 360°
	Vacuum System	❖ Automated vacuum system comprising of Ion-Pump (for Field-emission SEM)/Turbo-Molecular Pump (TMP) (along with water chiller if water-cooled TMP; Imported high quality chiller and compressor; specify the manufacturer and model) backed by rotary pump, pneumatic valves (clarify if any in-built proper safety measures against failure of power supply, vacuum, water-flow, etc. are provided).
	User Interface	Operational keyboard with control and adjustment knobs for frequently used SEM parameters (focus, magnification etc.)
	Future Upgradability	The specimen chamber should be large and compatible to accommodate other detectors and cryo option for future requirements (all these must be field installable).
	Specimen Holder	❖ Singles stubs - 10 nos. ❖ Multiple sample holder (≥ 5) – 5 nos. ❖ Carbon tapes - 10 nos.
	Calibration standards	Standard samples to check system calibration i.e. resolution, magnification etc. should be supplied along with the system.
	EDS	❖ Liquid nitrogen free dry Silicon Drift Detector (SDD) vacuum sealed for better light-element analysis. ❖ Energy resolution: ≥ 127 eV at Mn-Kα. ❖ At the installation site, the detector should also show ≤ 70 eV at F - Kα and $60 \leq$ C-Kα at 100,000 cps, as per established ISO norms. ❖ The detector should be capable of handling a count rate of at least 800,000 cps or, higher. ❖ Detection and Quantification : from Be to U ❖ The detector should also perform with <1 eV change in peak resolution and position with count rates ranging between 100 – 100,000 cps. ❖ The provided EDS system should have the capability to be upgraded to simultaneous Upgradability to WDX attachment for future research requirements. ❖ Supplied EDS server & analysis software should be capable of performing data acquisition, storing and transfer in common Windows based application format, qualitative & quantitative analysis, line scanning, elemental or dot-mapping (area) including spectrum imaging and phase mapping with specimen drift correction. ❖ All these capabilities should be applicable for polished flat specimens, fractured samples and nanostructured particulate systems. ❖ User interactive qualitative and standard less/ standards based quantification with K, L, M, N line database. Real time elemental mapping with auto elemental identification, quantification based on ZAF, PhiZAF. Should have quantification algorithm for uneven surfaces and under tilted conditions ❖ Pile up correction and background noise reduction, simultaneous imaging and analysis should be possible.

		❖ Thin film analysis software with nanometer scale resolution in both space and depth capabilities should be quoted. ❖ The detector area should be at least 50 mm² or larger, for handling high count rates, covering larger solid angle and working at low x-ray signal. ❖ Offline data analysis for EDS ❖ Calibration standard (Preferably from NIST) –multi-element standard materials for entire spectrum.
	EBSD	❖ The EBSD system should work on the same computer platform as that of EDS system, EBSD camera system (using minimum 12 bit digital CCD with on-chip integration) should be highly sensitive one to cater Nano-area analysis application ❖ Camera should have rectangular phosphor exactly matched to CCD chip size and capable for nano area analysis. The phosphor should be optimized for low –kV data application while working with SEMS. ❖ Indexing speed 100 Hz or better with at least 99% hit rate. ❖ Pixel resolution 1344 × 1024 or better. ❖ Camera should have motorized insertion and retraction mechanism with remote control digital handset. The position accuracy is to be 0.1mm. ❖ The camera movement should have audible safety alarm with auto retract mechanism. ❖ Camera should have tapered nose design to allow EDS detector to come very close to sample at shorter working distances ❖ Camera should have provision to install at least 4 Forward scattering Diodes as imaging detectors to acquire images with atomic, orientation, channeling contrast. ❖ Camera interface to SEM should have sliding and tilting interface plate to correctly position the camera at the shortest possible EBSD WD for optimal spatial resolution. ❖ The system software should include following features: (i) Data Acquisition Software (ii) Phase Reflector File Creation Software (iii) Pole Figure Software (iv) Mapping Software (v) ODF Software (vi) Imaging and Beam Control Software (vii) Stage Control Software (viii) Phase Identification Software
	Bidders shall furnish	❖ The technical note on the construction of the instrument. ❖ The complete optical diagram of the system. ❖ All essential accessories and requirements ❖ The technical specifications in the units as mentioned in the tender enquiry. ❖ The superior features of their instrument ❖ The safety features.
	Consumables	❖ Bidders shall provide itemized details of essential consumables for the instrument and accessories with price break-up for smooth operation of the instrument.
	Spare Parts	❖ Recommended essential spare parts list with price for both system and accessories.
	Computer system	❖ Computer and software must be the most up to date at the time of

	and Software:	delivery of the instrument. ❖ Supply should be complete with all required computer and printer hardware including interconnecting cables, any required interfaces, operating system software, applications software and all other components required for creating a complete system (communication cards etc.) and color laser printer with duplex mode printing facility.		
	Software	❖ Latest Windows based 32/64 bit software shall support full multitasking, setting of parameters for control (including accessories, if any), acquisition of data either of SEM or additional accessories- if any, data processing of acquired or archived data, real time display of method and acquired data, calibration, data storage and reporting, method development, time scheduler for instrument and accessories start-up, calibration and shutdown, macro programming, export of data in industry standard format, user management, system check., built in safety features.		
	Power/Electrical Requirement details	❖ Operation on 220 Vac ± 10%, 50 Hz. ❖ Vendor should specify the total KVA ratings of the complete system with breakups of all accessories. ❖ True online uninterrupted power supply (UPS) with 30 mins backup in accordance with the power requirement of the complete system/equipment preferably of APC, Numeric, Emerson, Aplab only.		
	The tender should accompany a compliance chart. A technical compliance chart should also be provided following the given format:			
	Serial Number	Tender Specification	Specification of your offered instrument	Extent of compliance
	Submittals along with bid	Please submit and confirm the followings: 1. The quoted model should be no older than 5 years . A list of installations clearly indicating the quoted model and other models of the company in India shall be furnished along with the contact details of the users. The bidder should have at least 20 FE-SEM installation in the eastern part of India. 2. Hard copy of the original catalogues from the manufacturer of the instrument with technical specifications and relevant application notes should be provided. 3. Spares & Service Support: Please certify that the instrument supplied shall be of latest technology and model, so that you would support with onsite service & spares for next 10 years. 4. Exhaustive pre-installation requirements spelling out every minute detail and requirements should be furnished. 5. Applicable Certificates of agency approvals of system/components as applicable. 6. Recommended essential spare parts and consumables list with budgetary price. 7. Warranty: The supplier shall warrant equipment, system components for a period of Five years following satisfactory		

		installation and commissioning. If the downtime is more than a week during warranty period,, then the downtime will be counted as extended period of warranty. 8. Service support at IACS: Please furnish details of the nearest service setup along with address, telephone numbers and name of service engineers available, response time during warranty and afterwards. It is mandatory that the vendor should maintain a service team of well trained, experience and competent service engineers, who are able to service the machine in our premises. Taking the instrument or any component will not be permitted. In exceptional cases, on due approval of competent authority of IACS, if the instrument or its components is taken out of the IACS premises for maintenance then all such expenses will be liability of the vendor. This service clause is valid under warranty as well as AMC. For any service related issue, the same has to be addressed within 24 h of reporting. 9. Training: The supplier shall perform on-site installation, commissioning and startup of all system components in order to provide a fully functional plant. The supplier shall train institute's personnel/students on the operation and maintenance of the system at least for 2 weeks. These services should be offered at no additional cost.
	Confirmations during supply of instrument	1. Exhaustive soft and hard copy of installation, operation, users, applications manuals, maintenance and service manuals – shall include system interconnection diagram, General arrangement of equipment drawings, complete circuit diagram, troubleshooting tips and diagnostic methods. 2. Standard tools kit should be provided for general maintenance services. 3. Installation and Testing: The installed system shall be performance tested at our premises in accordance with the manufacturer's/supplier's recommendations/specifications. Tests shall demonstrate the proper operation of the instrument and all components. 4. Commissioning and Training: The supplier shall perform on-site installation, commissioning and startup of all system components in order to provide a fully functional system. The supplier shall train onsite institute's personnel on the operation and maintenance of the system atleast for two week. These services may preferably be offered at no additional cost.

Bidders shall mandatorily submit the quotations along with compliance statements and other details categorically of the tender specifications as soft copy on CD, in addition to the hard copy.

B) PRICE BID:

1. **Price Bid:** The price bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super-scribed as "PRICE

BID" on the outer cover of the envelope as already detailed above. The price bids of only technically qualified bidders will be opened and they will be intimated the date and time of opening of price bids at their email IDs. Rest of the bids will stand rejected.

2. **Price:** Price to be quoted both on FOB/CIF basis for foreign currency or in Indian currency. Name of the particular port from where our authorized forwarder will lift the consignment must be mentioned clearly with FOB price.

3. Bid Security (EMD):

(a) An Account Payee Demand Draft of Rs. 8,00,000 lakhs- (eight lakhs only) drawn in favour of "Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)" is to be furnished by the bidders alongwith Technical Bid except those who are registered with the Central Purchase Organizations, Department of Micro, Small and Medium Enterprise (MSME), National Small Industries Corporation or the concerned Ministry or Department, as Bid Security money or Earnest Money Deposit (EMD). Alternatively, the Bidder shall have the option to furnish the EMD in the format of Bank Guarantee (BG).

(b) The Demand Draft for the Bid-Security money should have at least 90 (ninety) days validity period after the opening of the Bids.

(c) In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

4. **Performance Security:** An Account Payee Demand Draft on any nationalized bank of India of 10% of the order value in the name of "Indian Association for the Cultivation of Science" is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money

5. **Terms of Payment :** Payment through Letter of credit after successful installation subject to submission of Performance Security. Payment will be released after receiving the Performance Security.

(C) General Instructions:

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.

2. The tender should accompany a compliance chart.

3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.

4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally to visit the website (www.iacs.res.in/tender) for any amendment.

5. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.

6. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.

7. The model number, make and a printed literature of the product should be submitted positively.

8. Proposed delivery schedule should be mentioned clearly.
9. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
10. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
11. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
12. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
13. In case of any dispute, the decision of IACS authority shall be final and bidding on the bidders.
14. For any clarification regarding technical specifications, information etc., please send your queries to Prof. P. Dastidar (ocpd@iacs.res.in).
15. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Acting Registrar