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TECHNICAL CORRIGENDUM

Subject: Supply, installation and commissioning of Field Emission Scanning Electron Microscope (FESEM) with EDS & EBSD – Revised technical specifications and due date extension

Reference: Tender Enquiry No. 2026_IISRT_920550_1

Based on the clarification requests and approval of the competent authority, the revised technical specifications are placed at Annexure 1 to this corrigendum,

The due date and date of opening will be as follows: -

Due Date: 14-09-2026 1500 Hrs
Date of opening: 15-09-2026 1530 Hrs

All other Terms and Conditions remain the same. Bidders may quote accordingly

Thanking You,

Yours Sincerely

27/08/26

Assistant Registrar (P&S)

Annexure 1 to tender No. IISER/PUR/1353/MT-P/SP/25-26

Revised Technical specifications for the Field Emission Scanning Electron Microscope (FE-SEM) with Electron Backscatter Diffraction (EBSD) and Energy Dispersive Spectroscopy (EDS).

Sl. No.	Feature	Requirement
1	Scanning Electron Microscope type	Field Emission Scanning Electron Microscope (FE-SEM) with HV/LV modes, compatible with multiple detectors, including but not limited to EBSD, EDS, CL, etc.
2	Resolution (HV)	< 1.0 nm at 15 kV or more; ≤ 3.0 nm at 1–3 kV or better.
3	Resolution (LV)	≤ 2 nm at 15 kV or better.
4	Electron source	Schottky Field Emission Gun (FEG).
5	Accelerating voltage	20-500 V or lower to 30 kV continuous or better.
6	Probe current	≤ 10 pA to ≥ 300 nA or higher.
7	Operating modes	High vacuum, low vacuum/variable pressure up to ≥ 300 Pa or better. The vendor should clearly verify whether their instrument allows non-conductive geological rock samples to be analyzed using EBSD without coating the polished surface, under their operating conditions.
8	Magnification	6× to ≥ 1,000,000× or better.
9	Detectors	Secondary Electron (SE) detector, multi-segment Back-Scattered Electron (BSE) detector, LV-SE. Detectors capable of forming a composition image or equivalent, including surficial topographic images or equivalent. BSE should work for the entire working distance and should be capable of working both in HV and LV operating modes. In-lens/In-column SE/BSE should be a part of the system.
10	Stage	▪ 5-axis motorized compucentric/eucentric; X/Y ≥ 100 mm, tilt –5° to +70° or better for EBSD, rotation 360° or better. ▪ A joystick or trackball and a control panel for manual control, apart from software control.

		▪ Facility of an audible warning with an on-screen message.
11	Chamber	▪ ≥ 100 mm diameter specimen capacity. ▪ A navigational color camera inside the chamber should be live-streaming. Also, images of the samples inside the chamber should be available for taking. ▪ Specify the airlock or equivalent system. ▪ Justification for swift exchange of samples and for the protection of gun during sample exchange should be provided.
12	Vacuum system	The vacuum system inside the FE-SEM system shall be fully oil-free and shall include: sputter ion pump/s for maintaining ultra-high vacuum (10^{-7} Pa or better) conditions at the electron gun, turbomolecular pump/s as the primary high-vacuum pump (10^{-4} Pa or better) for the specimen chamber. The location of the rotary/scroll backing pump/s have to be clearly mentioned. The system must support stable operation under both high-vacuum and low-vacuum/variable-pressure modes.
13	Energy Dispersive Spectrometer (EDS)	▪ LN2-free SDD type, having a detector area of ≥ 65 mm²; ≤ 129 eV resolution on Mn-Kα or better, which is to be guaranteed at the site. ▪ The EDS detector should be able to handle a high input count rate of at least 1 million counts per second. ▪ The system should be capable of detecting the elements ranging from Be (Z = 4) to U (Z = 92). ▪ The EDS should be capable of performing both quantitative and qualitative analyses. The EDS software must include functions such as real-time mapping, area analysis, point analysis, line scanning, multipoint analysis, drift correction, and spectrum matching. The data should be extractable as images and in formats supported by Excel and Notepad, enabling further image analysis with Python or MATLAB. ▪ The EDS system should be capable of conducting high-resolution mapping at high speeds. ▪ The detector window should be made of a robust material to increase low-energy X-ray transmissivity and allow light-

		element analysis in addition to heavy elements.
14	Electron backscatter diffraction (EBSD)	▪ The EBSD camera system should be based on a high-performance CMOS-based or a hybrid, pixelated, direct-electron-detection system suitable for high-speed and high-sensitivity EBSD acquisition. ▪ The EBSD detector should provide a sensor/pattern resolution of ≥ 480 × 480 pixels, and should be capable of achieving ≥ 2000 indexed patterns/points per second under suitable SEM operating conditions on standard reference materials. ▪ The system should provide a reliable measure of indexing quality/accuracy, such as confidence index, fit value, indexing quality, hit rate, mean angular deviation, or equivalent indexing reliability parameter. An indexing success rate of 99% or equivalent is desirable. ▪ The EBSD system should include or support Forward Scatter Detector/Forescatter Detector imaging for orientation, atomic number, topographic, or channeling-contrast imaging. ▪ The system should include suitable hardware and/or software-based collision protection, such as proximity sensing, collision avoidance, stage/detector interlock, insertion limits, or equivalent protection to minimize the risk of detector-screen damage in a multi-user facility. ▪ The EBSD detector should be optimized for low-kV EBSD operation and should include motorized insertion and retraction with reproducible detector positioning. ▪ The EBSD detector should include an optimized phosphor screen, direct-detection sensor, or equivalent high-sensitivity detection arrangement suitable for high-speed EBSD mapping and analysis of weak-pattern or challenging materials. ▪ The EBSD software should support standard EBSD scan geometries suitable for grain-size, grain-boundary, phase, texture, and local misorientation analysis of deformed materials. The scan grid may be square, hexagonal, or equivalent, provided that it supports accurate crystallographic mapping and post-processing. In cases of low indexing, post-processing software that can enhance indexing should be included in the software package.

		▪ The EBSD system should include a high angular-resolution (0.05° or better) capability for measuring lattice rotation and for relative elastic stress/strain tensor mapping. ▪ The EBSD software should support large-area mapping, montage acquisition, or image/map stitching with minimal user intervention. ▪ The EBSD system should support imaging modes capable of generating orientation contrast, atomic number contrast, topographic contrast, and/or channeling contrast using forescatter/forward-scatter or equivalent detector signals.
15	A pre-collision detection warning system	A pre-collision proximity warning system should be included that operates when the stage is tilted during EBSD analysis. This warning system must activate before a potential collision between the stage and the detector occurs.
16	Integration	Unified EDS-EBSD software platform.
17	SEM integrated with EBSD+EDS Software	▪ Required for operating SEM with functions such as SE, BSE, EDS, EBSD, and FSD. ▪ Simultaneous EDS and EBSD analysis and acquisition should be done. ▪ Image analysis software should be provided. ▪ Entire capabilities include auto focus/alignment, signal mixing, measurement tools, pattern matching, and quantification of major elements. Images generated from different detectors should overlap seamlessly. ▪ Large area mapping or stitching of images should be possible with the EBSD software. ▪ 1 offline license should be included. ▪ The system software should include the following or equivalent features such as (i) Data Acquisition Software, (ii) Phase Reflector File Creation Software, (iii) Mapping, ODF, and Pole Figure Software, (iv) Noise Reduction and Cleaning Creation Software, (v) Imaging and Beam Control Software, (vi) Stage

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		Control Software, and (vii) Phase Identification Software. EBSD software should have the following or equivalent features, such as dynamic camera optimization. If required, the EBSD software should allow for improving the S/N level by averaging each pixel with its surrounding neighboring pixels. ▪ Software should be capable of automated EBSD and EDS analysis.
18	Auto functions	▪ Automatic Focus and Stigmator: For automatic assistance in aperture alignment, with adjustable amplitude and speed. ▪ Automatic contrast and brightness control. ▪ Automatic correction of image compression on tilted samples. ▪ Auto-compensation: Automatic magnification correction for change in working distance or acceleration voltage. ▪ Vacuum control system. ▪ Gun alignment, bias, and saturation. ▪ Compensation for kV. ▪ Probe current optimized for spot size. ▪ Spot size optimized for magnification.
19	Image display and processing	▪ Image Framestore: Signal acquisition by integration and averaging. ▪ Image area selection: full frame, reduced raster, line X, line Y, and spot modes, with independent setting of operational parameters such as line scan times, number of lines/frame, etc. ▪ Images from different detectors could be viewed simultaneously in a split-view area of the monitor. Images may be selectively processed and frozen.
20	Image output/Recording systems	▪ High-end control and analysis workstations, including Keyboard, mouse, control panel, etc. Preinstalled the latest Windows operating system. Original and licensed OS computer interface.

		▪ Suitable multiple monitors (≥ 24 inches) of high resolution for FE-SEM, configurable for single-frame display, 4-quadrant display, or better. It must display data, date, accelerating voltage, magnification, micron bar/ value, film number, and the user's comments, among other information. ▪ Comprehensive image annotation facilities with desirable fonts and colors.
21	Accessories	▪ Multi-specimen sample holders, 3 pre-tilted holders, 1 TKD sample holder, stubs, carbon paste, and carbon tape. ▪ The vendor should supply a complete set of tools that are required to run an electron microscopy laboratory. The kit contains several types of tweezers, a range of sample stubs, different types of sample mounting glue or tape, gloves, storage boxes, and other tools and supplies.
22	Other Accessories	i) A chiller, if required, to run the system. ii) Air compressor should be provided. iii) American Mineralogist or any equivalent database for mineral identifications using crystallographic data as obtained from EBSD analysis. iv) ICDD/ICSD database should be quoted as an optional item separately.
23	Number of ports	Sufficient ports should be available for future upgrades in addition to the required detectors. The total number of ports must be more than or equal to 5.
24	Training, service, and documentation	▪ On-site installation, training, and local support: The supplier will carry out the installation, commissioning, and demonstration of the complete system at no additional cost. After the successful installation and commissioning, on-site operational training for the deputed personnel (at least 5 or more) will be provided for the 5 days at no additional cost. ▪ All technical literature pertaining to the instrument, such as the catalogues and other documents providing the claimed technical specification, should be furnished along with the bid document and must be available on the website/the public domain.

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		▪ Details (including POs) of a minimum of 2 installations of the offered or previous model in the last five years at other academic or research institutions in India should be provided. ▪ Two performance satisfactory certificates from the laboratories where the offered or previous model has been installed should be provided. ▪ Copies of research publications in peer-reviewed journals from the offered or any previous model from the FE-SEM should be provided. ▪ Both hard and soft copies of the user manual should be provided. ▪ Contact details of service engineers should be provided. ▪ The vendor must provide the complete pre-requirements for the successful installation of the instrument. ▪ The vendor should have an ISO 9001 certification. ▪ Only the OEMs should participate in the tender or else their authorized dealers of representatives with an authorization letter or proof of supply from the OEM should be included in the tender. ▪ The components of the offered model should be guaranteed to be made available for at least the next 10 years.
25	Warranty	▪ One year warranty and one year of comprehensive AMC on the entire setup from the date of successful installation and commissioning.

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Assistant Registrar (P&S)