National Centre for Nanoscience & Nanotechnology, University of Mumbai, (NCNNUM),

National Center for Nanoscience and Nanotechnology, Ramkrishna Bajaj Sanskrut Bhavan, II floor ,University of Mumbai, Vidyanagari, Santacruz (E), Mumbai 400 098, India.
Tel: (022) 2654 3495, Fax (022) 26530299 Email: director@nano.mu.ac.in

Tender Document for

Focussed Ion Beam with Scanning Electron Microscope

No: NCNNUM/Tender/261/ 2012

Date: 24th January 2012
Part A - Terms and Conditions

Part B – Specifications

Price: Rs. 500/- (non refundable)

Important Dates:

Period of Sale of Tender Document	24th January till 31st January , 2012, during office hours
Last Date of Receiving sealed Bids/Tenders:	2nd February, 2012, 1.00 pm
Time and date of Tender opening	2nd February, 2012, 4.00 pm

National Centre for Nanoscience & Nanotechnology, University of Mumbai, (NCNNUM),

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No: NCNNUM/Tender/261 /2012

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Part A - Terms and Conditions

Short Tender Notice

National Center for Nanoscience and Nanotechnology
Ramkrishna Bajaj Sanskrut Bhavan,II floor
University of Mumbai, Vidyanagari, Santacruz (E),
Mumbai 400 098, India
Tel: (022) 2654 3495, Fax (022) 26530299
NCNNUM/261/ of 2012
Date: 24th January 2012

Sealed Tenders / bids for the purchase of **Focussed Ion Beam with Scanning Electron Microscope,** for National Center for Nanoscience and Nanotechnology, University of Mumbai are invited for and on behalf of University of Mumbai by the Director, NCNNUM.

Focussed Ion Beam with Scanning Electron Microscope

Blank Tender Document containing terms and conditions and technical specifications of the equipment are available in the Office of the Director National Center for Nanoscience and Nanotechnology, University of Mumbai, Vidyanagari, Santacruz (E), Mumbai 400 098, on all working days between 11.00 a.m. to 4.00 p.m. from 24th January 2012, to till 4 pm of 31st January 2012, by paying Rs.500/-(Rs. Five hundred only) in cash /Demand Draft from any Scheduled Bank/Nationalized bank, drawn in favour of **"Finance and Accounts officer, University of Mumbai".** Terms & conditions and technical specifications can also be downloaded. In case, the tender document is downloaded from the website, the Tender Document fee of Rs. 500/- should be enclosed in the Technical Bid Envelope, in the form of a Demand Draft from any Nationalized bank, drawn in favour of **"Finance and Accounts officer, University of Mumbai".** The tenders bids duly complete in all respects, along with the necessary documents and EMD of Rs 1, 50,000/-(Rs. One Lac fifty thousand only) should be submitted to The Director, National Center for Nanoscience and Nanotechnology, University of Mumbai on 2nd Februrary, 2012 at 1.00 p.m...

The tenders / bids so received shall be opened on 2nd Februrary, 2012, at 4 pm in the office of The Director, National Center for Nanoscience and Nanotechnology, University of Mumbai in the presence of the representatives of the suppliers. The names of shortlisted tenderers shall be announced on the website after scrutinizing the Technical bids and evaluating their suitability to meet the University requirements.

Right to reject any or all tenders without assigning any reason there for is reserved by the University of Mumbai.

Sd/-
Director,
NCNNUM,
University of Mumbai

Terms and Conditions of Supply:

1. The tender document along with terms & conditions are available for sale from 24th January till 31st January, 2012 in the office of the Director, National Centre for Nanoscience and Nanotechnology, University of Mumbai, Vidyanagari, Santacruz-E, Mumbai during office hours from 11.00.am To 4.00 .pm by paying tender fee of Rs 500/- in cash or a Demand Draft by any Scheduleded Bank / Nationalised bank drawn in favour of **"Finance and Accounts officer, University of Mumbai". The tender fee is not refundable.**
2. The completed sealed Tender/Bid in all respect will be accepted up to 2nd February, 2012, 1.00 pm in the office of Director NCNNUM, Ramkrishna Bajaj Sanskrut Bhavan,II floor Santacruz (E), Mumbai 400 098, India,

3. The received Tenders / Bids will be opened on 2nd February, 2012, 4.00 pm before the Tender opening committee in presence of the tender representatives of the tenders / bidders in the office of the Director NCNNUM.

4. Tenderers /Bidders shall submit the following documents along with their tender and **be placed in the Technical Bid Envelope i.e . Envelope No. 1)**.

   (a) Income-Tax clearance certificate from the Income-Tax Officer concerned, certifying that the tenderer has cleared all the Income-Tax dues.
   (b) Tenderers should be either manufacturer or authorized dealer of the said equipment and should submit the proof for the same. Also, the Tenderers should state whether they are a Proprietary Firm, Partnership Firm or a Private/Public Limited Company and furnish the proof of the same. If the tenderer is a partnership firm, the necessary partnership deed, disclosing the names of all partners and their interest in the firm shall be enclosed.
   (c) Tenderer should enclose the list of names of the organizations and laboratories to which similar equipment have supplied and a certificate to the effect that the performance of the supplied equipment was satisfactory.
   (d) The tender document must be accompanied by Earnest Money Deposit shall be Rs. 150,000/- (Rs One Lac Fifty thousand only). Earnest Money Deposit in the form of a Demand Draft drawn in favour of **"Finance and Accounts officer, University of Mumbai"** on any Scheduled/ Nationalized Bank, payable at Mumbai.
   (e) In case, the tender document is downloaded from the website, the Tender Document fee of Rs. 500/-(Rs Five hundred only) should be enclosed in the form of a Demand Draft from any Scheduled / Nationalised Bank drawn in favour of **"Finance and Accounts officer, University of Mumbai"**
   (f) VAT Registration No.
   (g) Technical specifications offered by the Supplier. (h)
   Technical compliance table
   (i) Proprietary certificate
   (j)The authority to sign to tender document shall be submitted invariably by the tenderer.
5. The rates should be mentioned in the **Schedule** attached with the Tender Document.
   Each page of the tender shall be signed in full and stamped with the seal by the Tenderer. The Tenderer must clearly state in what capacity he or she is signing the tender **(which should be placed in the Financial Bid Envelope i.e. Envelope No.2)**

6. The Tenderer shall submit the tender in two envelopes. The first envelope (Technical Bid) shall contain all the documents referred to in **para four above** and sealed. The second envelope (Commercial Bid) shall contain the **Schedule,** in which the Tenderer shall register the rates of equipment. The second envelope shall also, likewise, be sealed. Both the envelope then should be put together, and shall be sealed in an envelope, and shall prescribe time and date. The Technical Bid shall be opened first to ensure that Tenderer have submitted all the requisite documents. If the Technical Bids are found not in order or are deficient in some respect, the commercial bids in respect of such tenders shall not be opened. The date and time of opening the Financial bids shall be announced immediately after opening all the Technical bids.

7. Tender / bids not accompanied by the requisite amount of Earnest Money Deposit are liable to be rejected.
8. The Earnest Money Deposit paid by the supplier shall be forfeited, if the supplier fails to pay the necessary security deposit in the event of his tender being accepted.

9. The amount of Security Deposit/Performance Guarantee shall be 5 % of the accepted cost. In case of successful tenderer the amount of Earnest Money Deposit shall be converted in Security Deposit/Performance Guarantee.Security Deposit/Performance Guarantee shall be refunded after the warranty period is over. The Security Deposit/Performance Guarantee can be paid in the form of Demand Draft or a Bank Guarantee from a Nationalised scheduled bank drawn in favour of **"Finance and Accounts officer, University of Mumbai".**

10. Bidder should read carefully all the instructions and terms and conditions, etc before registering rates in the prescribed schedule of the tender. Price registering in the schedule of price to tender should be inclusive of all taxes and duties. The rate /price quoted shall be F.O.R/C.I.F Mumbai and to reach to the office of CNNUM or as directed in the order.

11. The offers made by the Tenderers shall be valid for 120 days after the last date of submission of tender.

12. **The Technical Documents shall be opened** by The Director, National Center for Nano science and Nanotechnology, **at 4.00 p.m. on 2nd February 2012,** for those bids for which minimum three Bidders have participated. The tenderers or their authorized representatives shall be allowed to be present at the time of opening of the tenders. Financial bids of only qualified tenderers shall be opened. The date and time of opening the financial bids shall be announced after opening and evaluating all the Technical bids.

13. In case of imported items/equipments, the rates should be quoted in the light of exemptions enjoyed by educational institutions. University is exempted from the payment of Octroi and the necessary certificate/form can be issued by the University. The customs duty applicable to the University of Mumbai is maximum 5% of the invoice.

14. Technical specifications of the instruments/equipments/articles are given in **Annexure** to these papers i.e. Part B.

15. The delivery, installation & operational training of the instruments/equipment should be completed within 3 months from placing of the order, in case of the imported equipment and within 15 days if the instrument/equipment is made in India.No extension shall be granted to the contractors/suppliers for the period of delivery, under any circumstances.

16. If the supplier fails to deliver the article as per the delivery schedule, the University of Mumbai shall be free to procure the balance/undelivered supply, at the risk and cost of the supplier, from other such suppliers

17. The goods, articles, materials equipment supplied by the supplier shall be accepted after inspection by an officer authorized by the competent authority. No articles/materials Which do not conform to the specifications laid down in the terms and conditions or damaged in transit accepted.

18. The bills of the suppliers shall be paid by the University after all the materials /articles/equipments have been received inspected and found in good condition as mentioned above..

19. **Vendor must submit Compliance statement in tabular form comparing each specification of the quoted item with that given in the Tender Document part B. The Vendor also must supply a soft copy of the Table only Microsoft in word format.**

20. **If the equipment is imported and requires PC, printer other peripherals, they can be bought from India and should be of International brand such as HP. The monitor should be LCD/TFT screen. The printer should be LaserJet printer. The processor should be Intel latest processor. The amount quoted for the items bought in India, installation; servicing etc. can be in Indian Rupees and the imported items can be quoted in foreign currency.**

21. **The warranty period shall be of Three years from the date of complete and satisfactory installation of the equipment.**

22. As the suppliers shall be responsible for the supply and installation (wherever necessary) of equipment at Mumbai, the cost towards insurance until destination in the University, shall be borne by suppliers.

23. In the event of any breach of the terms and conditions of the supply, the University of Mumbai may terminate the contract placed with the supplier, forfeit the security deposit of the supplier and make alternative arrangements for procurement of supplies at the risk and cost of supplier.

24. **Proprietary certificate, if any, should be included in the Technical bid.**

25. **The Conditional offers are liable to be summarily rejected.**

26. **Right to reject any or all tenders without assigning any reason there for is reserved by the University of Mumbai.**

Envelope No.1

National Centre for Nanoscience & Nanotechnology,
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(NCNNUM),

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Tender Document for

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No: NCNNUM/261/ /2012

Date 24th January 2012

PART B SPECIFICATIONS

Envelope No.2
(Financial/Price Bid)

SCHEDULE TO TENDER

Note:

1. Tenderers are advised to read carefully the Terms and Conditions of supply and the Instructions to the Tenderers" before recording the rates in this schedule.
2. No erasures or overwriting shall be allowed, unless they are authenticated under the full signature and the seal of the tenderer.
3. The Rates shall be FOR/CIF, at destinations/godowns/places indicated in the supply order.

Item no	Description of goods with details of specifications	Number/ quantity	Price/ Rate per Unit	Taxes	Duties	etc	Total

Total price ……

In words ……only

Date
Place

Signature of the Tenderer
Name of the signatory on tender
Seal of the Firm/Co./

Technical specification

Supply, installation and performance demonstration of Focused Ion Beam(FIB)system with Necessary hardware and software in all modes of vacuum namely high vacuum, variable pressure, extended vacuum for site specific sample preparation and subsurface sample investigation, including a high throughput FIB and analytical SEM. The high throughput FIB allows for fast material removal over larger areas and also provides for low kV cleaning for high quality sample preparation. An unprecedented ability to deal with uncoated, non-conductive samples is ensured with techniques for charge reduction in both high vacuum (FIB and SEM) as well as in low vacuum (SEM) operating modes and should be coupled with other analytical detection systems and modern automation applications

Specifications for the Focussed Ion Beam with Scanning Electron Microscope.

MATERIAL DEPOSITION & ETCHING

Gas Injectors

Five or more reconfigurable fully automatic separate gas injectors for
(a)Deposition ofPt as standard.
(b)**Others gas chemistries to be quoted as optional**

Imaging: The system should be capable of sequential as well as simultaneous alternating/imaging using ion and electron beams

Charge neutralization: The system should have provision for neutralizing the specimen when milling insulating substrates. This should be a standard feature in the system.

STAGE & CHAMBER: 5-axis motorized stageformountinguptoφ*2"*-φ*4"*Si wafer and arbitrary sizes pieces Max. specimen size: ≥100mm x 100mm ; ≥ 10mm thickness ,Movement range: X ≥ 100 mm or better , Y ≥ 100mm or better Z≥ 50 mm; Rotation=360° ,Tilt Range :From ≤ -10° to ≥ +70°

Ports: At least three spare ports on chamber and one spare port on door

Specimen holders
(a)Specimen holders& stubs for mounting φ*2"*–φ*4"*wafers
(b)Sample holder for mounting eight ormore1cm^{2}sample
(c)STEM sample holders for mounting grids

Vacuum system

Fully automatic coil free vacuum system consisting of Ion getter pumps for
gun and column, TMP, backing pump, pneumatic valves and gauges in column, chamber, pumping & backing line. Chamber vacuum: Base vacuum: ≤ 6 x10-6mbar (≤ 5 x10-5mbarin ≤ 10 minutes I

ION SOURCE & OPTICS

Ion source and column :Suitable column with Gas liquid metal ion source with provision for beam & aperture alignment, adjustable stigmator, variable scan speed and blanker for blanking, pulsing and modulating ion beam

Source lifetime: ≥ 1000 hours, Imaging Resolution: ≤ 7 nm at 30 kV at beam coincident point

Magnification : From ≤ 300X to ≥ 500,000X (Continuously variable)

Acc. Voltage: **≤ 1kV to 30kV, continuously variable**

Beam current : Variable from ≤2 pA to ≥ 50nA

SYSTEM HARDWARE AND CONTROLS

Image Processor: ≥ 4096 x 4096 pixels ; dwell time range 50 ns to 20 ms/pixel

Operating System : Windows 7 or higher
Mixing of detector signals :Mixing of various detectors with option of pseudo coloring the images Monitors: 19"or higher

ELECTRON SOURCE & OPTICS

Source/column :Electron column with Schottky thermal field emitter with provision for beam and aperture alignment, adjustable stigmator, variable scan speed etc.
Source Lifetime:≥ 1000 hours
Magnification: ≤ 30X to ≥ 1000Kx (Continuously variable
Acc. voltage: ≤ 500 V to ≥ 30 kV (Continuously variable)
Probe current :≤ 5 pA to ≥ 200nA
Electron beam(induced deposition a): Electron beam induced deposition system with GDSII Files and capability to import files in BMP format

DETECTORS:

SE Detector Everhart Thornley detector, SE detector in high vacuum, variable vacuum and extended vacuum mode

Resolution

SE Detector ≤ 1.5 nm @ 30 kV; High Vac ;
SE Detector ≤1.8 nm @ 15 kV High Vac
SE Detector ≤3.0 nm @ 1 kV High Vac
SE Detector ≤2.0 nm @ 30 kV variable vacuum mode
SE Detector ≤2.0 nm @ 30 kV extended vacuum mode

BSE detector :Solid-state Back scattered electron (BSE)detector, *Resolution:* ≤ 3.0 nm @ 30 kV

Ion Detector: Secondary ion detector, *Resolution* : ≤ 10.0 nm at 30 kV at optimum WD

STEM detector: It should produce both separate and combined dark field, bright field and high angle annular dark field STEM images, *Resolution* **::≤ 1.0 nm@ 30 kV** At optimum WD & high vacuum

Energy Dispersive Spectrometer (EDS):

Energy dispersive spectrometer LN_2-free Silicon Drift Diode EDS Detector with integrated internal FET & peltier cooling along with necessary software& Hardware for detection of elements from Boron upwards should be quoted as standard. The detector size should be ≥30 mm^2

Spectral Resolution: ≤ 130 eV or better for Mn Kα at 75,000 cps, ≤ 60 eV or better for CKα at 50,000 cps

Hardware of the EDS system: should have suitable analytical processor to handle output x-ray count rates in excess of 250 kcps, image size for imaging/mapping should be up to 4096x4096 pixels *Software* : For data acquisition, quantitative analysis and multi-element mapping.

CCD IR-CCD camera with necessary diodes for illumination

Optional items

1.**EBSD** :Detector quote for EBSD Detector coplanar with EDS detector for determination of crystallographic orientation, grain size and orientation

2.**Micromanipulato**r: quote for a Total FOUR nos. of three-axis manipulators including feed through, control unit etc. out of which TWO should have low current option. The motion of the manipulators should be Cartesian. *Range* Operating: >10 mm in XYZ; Piezo Range: >10µm in XY &>1µm in Z with resolution better than 10 nm

Electrical Leakage current ≤ 0.5 pA @ 1 V (≤ 0.05 pA for low current option) Maximum voltage≥ 100V (≥ 200 V for low current option) Current range≥ 100 mA to ≤ 10 nA (≤ 10 pA for low current option) *Four probe plug-in (Optional)* Three four-point probe plug-in for micro manipulator with probes having5µm, 15 µm and 25 µm spacing, mounting tweezers, test resistor

Probe tips: 100 Nos. of assorted size

Current sensor Current sensor for crash-proof landing of probe tips on sample surface

Sd/-
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University of Mumbai