

**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

**X-ray photoelectron spectroscopy (XPS) with X-ray beam induced
secondary electron images (SXI), and XPS maps**

No: NCNNUM/Tender/ 298 a/2012

Date: 9th February 2012

Part A - Terms and Conditions

Part B – Specifications

Price: Rs. 500/- (non refundable)

Important Dates:

Period of Sale of Tender Document	9 th February till 28 th February , 2012,
Last Date of Receiving sealed Bids/Tenders:	29 th February, 2012, 1.00 pm
Time and date of Tender opening	1 st March, 2012, 4.00 pm

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Part A - Terms and Conditions

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/298 a/ of 2012
Date: 9th February 2012

Sealed Tenders / bids for the purchase of Tender Document for **X-ray photoelectron spectroscopy (XPS) with X-ray beam induced secondary electron images (SXI), and XPS maps**, for National Center for Nanoscience and Nanotechnology, University of Mumbai are invited for and on behalf of University of Mumbai by the Director, NCNNUM.

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 9th February 2012, to till 4 pm of 28th February, 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 29th February 2012 at 1.00 p.m.**

The tenders / bids so received shall be opened on 1st March 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 9th February 2012, to till 4 pm of 28th February, 2012 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 Scheduled Bank / Nationalised bank drawn in favour of **“Finance and Accounts officer, University of Mumbai”**. **The tender fee is not refundable.** The completed sealed Tender/Bid in all respect will be accepted up to 29th February 2012 at 1.00 pm in the office of Director NCNNUM, Ramkrishna Bajaj Sanskrut Bhavan, II floor, Santacruz (E), Mumbai 400 098, India.
1. The received Tenders / Bids will be opened on 1st March 2012 at 4.00 pm before the Tender opening committee in presence of the tender representatives of the tenders / bidders at the office of the Director NCNNUM.
2. 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 EMD of Rs 1,50,000/-(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 CNUM 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 400 p.m. on 1st of March, 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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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 wordsonly

Date
Place

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

Specifications for

X-ray photoelectron spectroscopy (XPS) with X-ray beam induced secondary electron images (SXI), and XPS maps

The proposed system must be able to characterize by x-ray photoelectron spectroscopy (XPS) conducting and insulating solid materials used for a broad range of materials applications.

The XPS system must be capable of achieving the following:

- The ability to provide quantitative elemental and chemical state information from the surfaces of solid materials including: metals, semiconductors, polymers, glass, ceramics, and powders.
- The ability to perform routine large area XPS measurements.
- The ability to perform complete XPS experiments from selected areas. Complete XPS experiments include the ability to provide survey spectra, narrow region spectra from elements of interest, and sputter depth profiling if required.
- The minimum analysis area for selected area measurements should be 10 μm in diameter or less.
- The ability to obtain optical images, x-ray beam induced secondary electron images (SXI), and XPS maps for locating sample features of interest with a variety of contrast mechanisms (optical, secondary electron, elemental, and chemical).
- Sputter depth profiling to explore composition below the surface of a material and characterize multi-layer thin film structures with a monatomic Ar ion beam.
- Sputter depth profiling should be available in both the large and selected area analysis modes.
- In the selected area mode, multi-point sputter depth profiling should be available to simultaneously obtain depth profiles on and off of a selected sample feature or material defect.
- The ability to provide Compucentric Zalar (azimuthal) rotation during the sputter portion of a sputter depth profile to reduce sputtering artifacts that may degrade the quality of the depth profile.
- The ability to perform angle dependent XPS (ADXPS) measurements.
- Robust charge neutralization capability for the analysis of insulating materials to facilitate ease-of-use and automated analysis.
- Robust auto-Z height alignment of samples to facilitate ease-of-use and automated analysis.
- Intuitive easy-to-use software packages for instrument operation and data reduction.
- The data reduction package should be available in a stand-alone format for off-line data reduction.

To achieve the above objectives, the following are mandatory requirements:

1. A turbo pumped sample introduction chamber for the rapid introduction of samples into the main analysis chamber.
2. A UHV analysis chamber with ports that allow for the addition additional x-ray sources, ion sources, and sample preparation chambers to meet current and future needs. The system should be capable of achieving an ultimate base pressure of $6.7E^{-8}$ Pa in the analysis chamber with no samples present.
3. The energy analyzer should be a 180° hemispherical analyzer with an electrostatic input lens to avoid the problems associated with magnetic immersion lenses.
4. The energy analyzer detector should provide up to 128 channels in both the spectroscopy and mapping analysis modes.
5. A mono-chromated micro-focused scanning AlK α x-ray source.
6. The diameter of the micro-focused mono-chromated scanning x-ray beam must be user definable from 10 μ m to 300 μ m.
7. The mono-chromated micro-focused scanning x-ray beam must have the ability to scan the x-ray beam, of any specified diameter, on the sample, to an area of greater than 1000 μ m x 1000 μ m.
8. The ultimate XPS energy resolution of ≤ 0.50 eV FWHM for the Ag 3d $_{5/2}$ peak.
9. XPS sensitivity as demonstrated using the Ag 3d $_{5/2}$ peak performance shown in the table below is required to ensure a viable selected area and large area XPS capability:

Mandatory Sensitivity Selected Area Analysis:	Size	Resolution (FWHM on Ag 3d $_{5/2}$ peak)
≥ 4 kcps	≤ 10.0 μ m	≤ 0.60 eV
≥ 12 kcps	≤ 10.0 μ m	≤ 1.00 eV
≥ 15 kcps	≤ 10.0 μ m	≤ 1.30 eV
≥ 15 kcps	≤ 20.0 μ m	≤ 0.60 eV
≥ 45 kcps	≤ 20.0 μ m	≤ 1.00 eV
≥ 60 kcps	≤ 20.0 μ m	≤ 1.30 eV
Large Area Analysis:		
> 250 kcps	100 x 1400 μ m	≤ 0.60 eV
> 1 Mcps	100 x 1400 μ m	≤ 1.00 eV

10. XPS spectroscopy with a minimum spatial resolution of 10 μm or less.
11. XPS mapping with a minimum spatial resolution of 10 μm or less.
12. X-ray induced secondary electron imaging with a minimum spatial resolution of 10 μm or less.
13. The system should be capable of performing ADXPS measurements at multiple angles automatically under software control and maintain the original analysis position as the angle is changed.
14. Sample stage movement must allow analysis of samples of different sizes up to 60 mm in diameter and up to 7 mm thick.
15. The instrument should be equipped with a robust dual beam charge neutralization system that uses low energy electrons (typically 1-2 eV) and low energy ions (typically 5-10 eV) for charge neutralization.
16. Dual beam charge neutralization should be software-controlled and one setting should work for nearly all sample types with no operator intervention (tuning). Dual beam charge neutralization must be demonstrated on the O-C=O 289 eV C 1s peak, from clean PET, to be ≤ 0.85 eV FWHM.
17. Compucentric Zalar rotation shall be provided.
18. The base system should be equipped with a floating column monatomic Ar^+ ion gun with neutral rejection and an energy range from 150eV to 5 kV for sputtering.
19. The same floating column Ar^+ ion gun must also be able to provide low energy ions down to 5 eV for dual beam charge neutralization.
20. The floating column Ar^+ ion gun must also be able switch between the neutralization and sputtering modes under software control during a sputter depth profile.
21. The instrument control software must be able to save different sputtering conditions for future use.
22. Maximum current of the monatomic argon ion gun will be ≥ 5 μA at 5 kV.
23. X-ray induced secondary electron imaging capabilities for the precise definition of the analysis position will be provided.
24. Optical platen imaging for sample navigation.
25. Vacuum pumping system consisting of ion pumps and Ti Sublimation pump with software controlled vacuum management.
26. A set of security features protecting the integrity of the vacuum system, in vacuum components, and electronics in case of power failure.
27. A state of the art computer system to manage, process, and print the acquired data.
28. The system must have the ability to be controlled remotely via an internal network or the internet.

The following optional accessories must be available from the manufacturer to meet current and future surface analysis requirements:

- Optional non-monochromatic dual anode (Mg/Al or Mg/Zr) x-ray source.
- Optional ultra-violet light x-ray source for valance band spectroscopy and work function measurements.
- Optional 10 kV or 20 kV C₆₀ ion sources for chemical thin film analysis of organic and polymer materials.
- Optional 20 kV Ar₂₅₀₀⁺ gas cluster ion source for chemical thin film analysis of organic and polymer materials.
- Optional hot/cold (-120 C to 500 C) sample stage that maintains all 5 axes of motion when hot or cold.
- Optional 10 kV scanning electron gun for performing Auger Electron Spectroscopy with a minimum probe size of 100 nm or less.

Sd/-
Director,
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University of Mumbai