

## **INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT**

Sealed tender offers are invited in two separate sealed covers (Technical and Commercial offers) from eligible manufacturers/suppliers or their direct Indian agents for the supply of the following equipment.

### **Multi-target RF-DC sputtering system**

Please send offers, ALONG WITH DESCRIPTIVE CATALOGUE/ BROCHURE. The validity of the bid should be at least four months (120 days) or more from the date of the opening of this tender. Please ensure that your quotation reaches not later than **10.08.2018 at 15:00 Hrs** at the following address:

**Dr. AYAN ROY CHAUDHURI,**  
**Assistant Professor, Materials Science Centre,**  
**Indian Institute of Technology Kharagpur – 721 302, West Bengal, India**

Earnest money of **Rs. 40,000/-** is to be deposited in the form of Account payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India. Any bid which is not accompanied with an EMD shall be summarily rejected. Earnest money deposited will be forfeited if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. No interest will be paid on the earnest money of the unsuccessful bidders.

Tender Reference	<b>IIT/SRIC/MSC/IFO/ARC/18-19/EQ-1, Dated: 11.07.2018</b>
Price of Tender Document	<b>NIL</b>
Last Date and Time for submitting the tender document	<b>10.08.2018 at 15:00 Hrs (Indian time)</b>
Time and Date of Opening of Technical Bids	<b>10.08.2018 at 16:00 Hrs (Indian time)</b>
Place of Opening Tender	<b>Materials Science Centre, Indian Institute of Technology Kharagpur – 721 302, West Bengal, India</b>
Address of Communication	<b>As stated above</b>
Contact Telephone Numbers	<b>+91- 3222 - 283978</b>
E-mail	<b>ayan@matsc.iitkgp.ac.in</b>

**DETAILED TECHNICAL SPECIFICATIONS FOR**  
**Multi-target RF-DC Sputtering System**

1. Completely stand alone model.
2. The equipment should have 'sputter up' configuration and accordingly the sputter sources and substrate holders should be designed.
3. The equipment should be able to deposit any combination of metals, metal alloys, composites, semiconductors, insulators on semiconductor/glass/metal/alloy substrates in a single run as per the number of sputter sources and power supplies detailed herein.
4. The equipment should have provision to accommodate targets of 2" diameter. Changing of targets should be possible without breaking any internal seals.
5. The equipment should have four magnetron sputtering sources placed in a confocal configuration for co-deposition as well as for multilayer deposition without breaking the vacuum. All the guns should be equipped with shutters. User adjustable in and out movement of the sources with respect to the plane of the substrate should be possible. The distance between the sources and the substrate should be as follows: **maximum: 10 cm and minimum: 4 cm**. This is to be clearly mentioned in the technical and A design diagram should be provided along with the technical bid.
6. The equipment should have water cooling arrangement to the magnetron sources to ensure uniform cooling of the target during sputter deposition.
7. For the circulation of cold water, the equipment should be supplied with a PID programmable water chiller (with capacity no less than 0.5 TR)
8. The quoted magnetron sources should be compatible with any of the DC, pulsed DC and RF power supply.
9. Two RF power supplies of 300 Watt each at frequency of 13.56 MHz with auto matching network (of reputed make, such as, SEREN/ Advanced energy/ Comdel/ T&C power conversion or equivalent for both the RF generator and RF Matchbox) should be connected to two of the sources.
10. One DC power source of up to 0.5 - 1 kW of reputed make with automatic arc suppression (**Documentation of automatic arc suppression details from the original manufacturer should be included in the technical bid**)
11. A switch is to be supplied which can alternatively connect two magnetron sources to the DC power supply.
12. The equipment should have provision to accommodate substrates of any size  $\leq 2'' \times 2''$ .
13. The equipment should have provision for substrate heating up to 900 °C (**working temperature, also under oxygen ambience**) with PID controller. Temperature fluctuation should be within  $< 5\%$  over 2" diameter.
14. The heating element used for substrate heating in item (13) should be compatible with vacuum, plasma and/or reactive environment.

15. The equipment should be able to provide thickness uniformity of  $\leq 5\%$  over the 2"×2" substrate for the sputter deposition of any one or combination of metals/metal alloys/composites/semiconductors/insulators.
16. The equipment should have provision so that the substrate holder can provide in situ rotation while heating **(5-20 rpm)**.
17. The vacuum chamber should be made of electro-polished SS 304 material along with optical view port for plasma viewing with shutter arrangement to avoid material deposition on the view port.
18. The equipment should be able to achieve vacuum better than  $3 \times 10^{-6}$  Torr in less than 60 minutes of pumping time from atmosphere. The instrument should be able to achieve ultimate vacuum  $\sim 1 \times 10^{-6}$  Torr in a clean and dry atmosphere. **Documentation from OEM regarding the range of achievable vacuum should be included in the technical bid.**
19. The equipment should be connected to a diffusion pump (with pumping speed no less than 600l/s) with liquid nitrogen trap of suitable capacity and rotary pump (**pumping speed no less than 12 m<sup>3</sup>/hour**) to achieve the desired vacuum level mentioned in items (18). SS made gate valve and suitable vent valves are to be provided.
20. The pumping system should have suitable vacuum gauges (e.g. Pirani and penning gauges) to measure the chamber pressure at the start of any of the pumping systems as indicated in item (19).
21. The chamber is to be so designed that the pumping can be upgraded later with dry pumps (e.g. turbo molecular pump of reputed make, e.g. Pfeiffer, Leybold etc.) with pumping speed greater than 650 l/s for nitrogen (e.g. Hipace 700 from Pfeiffer). **The flanges are to be so designed that the up gradation when required should involve only replacement of the pumping unit (i.e. no change in the flange size, type or no adapter should be required)** The vendor should mention in the technical bid about the most suitable pump which can be used as an upgrade and quote for the same separately as an optional upgrade.
22. Demonstrable leak rates better than  $1 \times 10^{-9}$  torr lit/sec for the quoted sputtering unit by using Helium Mass Spectrometer Leak Detector.
23. The instrument should have provision to carry out reactive sputtering in oxygen, nitrogen and reducing atmosphere.
24. The equipment should comprise of two Mass Flow Controllers (of reputed make) with power supply to control the flow of Argon, oxygen and nitrogen into the sputtering chamber. Suitable gas inlets (preferably separate inlets for different gases) are to be provided for argon, oxygen and nitrogen. The vendor must specify the details of the gas inlet system it offers.
25. The equipment should comprise of a Quartz crystal film thickness monitor (auto ranging from 0 to 999.9 k Angstrom) of reputed company with 3 digit rate display and 4 digit thickness display. 10 numbers of spare Quartz crystals are also to be included.
26. The vendor should provide a schematic diagram of the whole equipment clearly showing the configuration.

**Other specifications:**

1. The vendor should offer in case of successful bid, pre delivery inspection of the equipment at their site for all the functionalities of the equipment as per the technical specifications mentioned in the tender document. The vendor shall bear the cost of any successive visit necessary if satisfactory demonstration of any feature as per the technical specification mentioned in the tender document cannot be conducted during the mutually agreed visit by the customer.

2. The equipment consists of the following principal components: (i) Sputtering chamber with appropriate ports mounted in a frame along with sputter sources, shutters for sputter sources, heated sample holder attachment, PID controller, throttle valve, (ii) PID controlled programmable water chiller along with water manifold, water flow switch, (iii) Instrumentation rack, (iv) Pumping system with vacuum gauges, liquid nitrogen trap, quartz crystal monitor with display, spare crystals, digital mass flow meters with valves and (v) sputter power supplies RF and DC.

**The price bid should be submitted quoting separately for the items as mentioned below:** Items (i)-(iii) should be quoted under the classification **Multi-target RF-DC sputtering system hardware** and items (iv) and (v) are to be quoted under the classification **Power supply, pumping, growth control and rate monitor for the Multi-target RF-DC sputtering system**. All prices should be quoted in Indian Rupees.

3. A Checklist and Compliance statement against each item mentioned in the technical specification must be provided in tabular format.

#### 4. **Warranty:**

The complete instrument and accessories excluding consumables should be under warranty for a period of one year from the date of installation. Extended warranty is preferable. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts. But it should be repaired within reasonable time from the date and time of complaint lodged by the user. The supplier should provide all spares required for making the instrument operational.

5. AMC: Please also mention the financial involvement for two years on site Annual Maintenance after normal warranty period separately as an additional offer.

#### 6. **Maintenances:**

The tender document must indicate what kind of service/maintenance is required for the system. Vendor should be easily accessible and available on demand within 96 hours of any problem reported. Two compulsory visits for maintenance during the warranty period must be conducted after installation.

#### 7. **Training and demonstration:**

Vendor should provide on-site demonstration of all the features of the system and training to operate the system should be arranged at no extra cost.

#### 8. **User list with contacts:**

Vendor should provide detail list of installations in India with all contact details and model details and modules available so that IIT Kharagpur can approach the contact person for any feedback. Original documents supporting the specifications should be provided.

9. **Spares:** The supplier of the equipment must confirm in writing that the spares for the equipment will be available for a period of at least ten years after installation and commissioning of the equipment.

#### **10. Operating manual:**

One set of operating manual, service manual, maintenance and safety instructions, recommended recurring spare parts list, mechanical and electrical drawings, part lists, air, water and electrical diagrams (in English) should be provided with the instrument.

#### **11. Delivery:**

Delivery must be within three months of the order being placed.

### **GENERAL TERMS & CONDITIONS**

PLEASE SPECIFICALLY INDICATE THE FOLLOWING POINTS IN YOUR QUOTATIONS AND COMPLY THE TERMS AS MENTIONED HEREUNDER:-

1. TENDER ARE INVITED COMPLYING THE REQUIREMENT FOR TENDER AS DETAILED IN THE TENDER SPECIFICATION TO BE SUBMITTED IN THE COMPANY'S / FIRM'S LETTERHEAD NEATLY PRINTED / TYPED DULY SIGNED BY AUTHORIZED PERSON WITH THE SEAL OF THE BIDDERS. ALL ENVELOPS CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPS SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOP.

### **THE FOLLOWING DOCUMENTS ARE REQUIRED FROM THE INDIAN AGENTS OF FOREIGN FIRMS:**

- 1.1 FOREIGN PRINCIPAL'S PROFORMA INVOICE INDICATING THE COMMISSION PAYABLE TO THE INDIAN AGENT AND NATURE OF AFTER SALES SERVICE TO BE RENDERED BY THE INDIAN AGENT.
- 1.2 COPY OF THE AGENCY AGREEMENT WITH THE FOREIGN PRINCIPAL INDICATING THE NATURE OF AFTER SALES SERVICES, PRECISE RELATIONSHIP BETWEEN THEM AND THEIR MUTUAL INTEREST IN THE BUSINESS.
2. TECHNICAL CATALOGUE/LEAFLET SHOULD BE ENCLOSED WITHOUT FAIL. PROVIDE COMPLIANCE STATEMENT WITH RESPECT TO THE TECHNICAL SPECIFICATIONS MENTIONED ABOVE.
3. PLEASE CONFIRM WHETHER YOU ARE AUTHORISED TO QUOTE ON BEHALF OF YOUR PRINCIPALS AND IF SO, PLEASE ENCLOSE A COPY OF SUCH AUTHORISATION WITH YOUR QUOTATION.
4. **PRICE BIDS FOR FOREIGN FIRMS:** PRICES ARE TO BE QUOTED ON 'EX-WORKS' DULY PACKED OR ON "FCA/FOB" INTERNATIONAL PORT" BASIS AND ALSO INCLUDING AGENCY COMMISSION PAYABLE TO YOUR INDIAN AGENTS, IF ANY SHOWING CLEARLY THE FOLLOWING BREAK UP:-
  - I) EX-WORKS PRICE
  - II) PACKING & FORWARDING
  - III) FREIGHT
  - IV) ANY OTHER RELEVANT EXPENSES.
  - V) TAXES PAYABLE BY THE INSTITUTE

INSURANCE WILL BE PAID BY OUR INSTITUTE SEPARATELY AND SHOULD NOT FORM PART OF THE QUOTED PRICE.

**PRICE BIDS FOR INDIAN FIRMS:** PRICES ARE TO BE QUOTED ON F.O.R., IIT KHARAGPUR, ON DOOR DELIVERY BASIS CLEARLY SHOWING THE BREAK UP.

5. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF 120 DAYS FROM THE DATE OF OPENING.
6. INDIAN AGENTS ADDRESS AND PERCENTAGE OF AGENCY COMMISSION INCLUDED IN ABOVE F.O.B./EX-WORKS PRICE. (THIS WILL BE PAID TO THE INDIAN AGENTS IN INDIAN RUPEES ONLY AND NOT IN FE). PLEASE ENCLOSE COPY OF AGENCY AGREEMENT ENTERED INTO WITH YOUR PRINCIPALS INDICATING THE NATURE OF AFTER SALES SERVICES OF INDIAN AGENTS, PRECISE RELATIONSHIP & MUTUAL INTEREST IN THE BUSINESS.
7. **MEASUREMENTS/WEIGHT:** NETT/GROSS OF THE CONSIGNMENT. IN CASE OF AN ORDER, YOU SHALL USE AIR WORTHY PACKAGE (AS APPLICABLE) DULY CERTIFIED WITH DOCUMENTS – PLYTO – SANITARY CERTIFICATE (AS PER QUARANTINE ORDER 2003).
8. **SCOPE OF SUPPLY:** SHOULD INCLUDE FREE INSTALLATION AND COMMISSIONING
9. **PAYMENT TERMS FOR FOREIGN FIRMS**

**The offer will be made on a single currency and only one PO will be issued for the entire scope of the supply.**

- A) 90% PAYMENT THROUGH SIGHTDRAFT/FORIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION AND 10% AFTER SUCCESSFUL INSTALLATION & COMMISSIONING.
- B) BANK CHARGES ON LC/SD (WITHIN INDIA APPLICANT ACCOUNT AND OUTSIDE INDIA TO BENEFICIARY ACCOUNT).

**PAYMENT TERMS FOR INDIAN FIRMS**

A) 100% PAYMENT THROUGH CROSSED ACCOUNT PAYEE CHEQUE / ELECTRONIC TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER & CONDITION AND SUCCESSFUL INSTALLATION & COMMISSIONING.

B) ENSURE MENTIONING

i) BANK DETAILS OF THE BENEFICIARY, GST NO. AND PAN NUMBER

ii) FULL NAME AND ADDRESS OF THE BENEFICIARY ON WHOM ORDER HAS TO BE PLACED

10. WHETHER ANY EXPORT LICENCE IS REQUIRED FROM YOUR GOVERNMENT, IF SO, PLEASE CONFIRM WITH DETAILS.
11. COUNTRY OF ORIGIN OF THE GOODS IS TO BE MENTIONED.
12. THE INSTITUTE SHALL PROVIDE THE CONCESSIONAL CUSTOMS DUTY AND EXCISE DUTY EXEMPTION CERTIFICATE AS PER GOVT. NOTIFICATION NO. 51/96 CUSTOMS DATED: 23.07.1996 AND CENTRAL EXCISE DUTY EXCEMPTION IN TERMS OF GOVT. NOTOFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.
13. **LIQUIDATED DAMAGES:** THE STORES SHOULD BE DELIVERED / DISPATCHED TO DESTINATION AND READY FOR OPERATION NOT LATER THAN THE DELIVERY DATE SPECIFIED. IT THE SUPPLIER FAILS TO DELIVER ANY OR ALL THE STORES OR PERFORM THE SERVICE BY THE SPECIFIED DATE, LIQUIDATED DAMAGES AT 1% PER MONTH OR PART THEREOF IN RESPECT OF THE VALUE OF STORES WILL BE DEDUCTED FROM THE CONTRACT PRICE SUBJECT TO A MAXIMUM OF 5%.

ALTERNATIVELY, THE ORDER WILL BE CANCELLED AND THE UNDELIVERED STORES PURCHASED FROM ELSEWHERE AT THE RISK AND EXPENSE OF SUPPLIER.

14. **PATENT RIGHTS:** THE SUPPLIER SHALL INDEMNIFY THE PURCHASE AGAINST ALL THIRD PARTY CLAIMS OF INFRINGEMENT OF PATENT, TRADEMARK OR INDUSTRIAL DESIGN RIGHTS ARISING FROM USE OF THE GOODS OR ANY PART THEREOF IN INDIA.
15. ONLY THOSE BIDDERS WHO'S BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.
16. THOSE BIDDERS WHO DO NOT RECEIVE ANY COMMUNICATION FOR PARTICIPATION IN PRICE BID OPENING MEETING MAY PRESUME THAT THEIR BID HAS NOT BEEN ACCEPTED BY THE INSTITUTE.
17. CONDITIONAL OFFER WILL NOT BE ACCEPTED.
18. LATE TENDERS I.E. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.
19. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS:-
  - A) INCOME TAX RETURN (3 YRS) AND LATEST SALES TAX RETURN (GST No.), AND PAN NO.
  - B) BANKER'S SOLVENCY CERTIFICATE
  - C) SUMMARY OF AUDITED STATEMENT OF ACCOUNTS FOR THE LAST THREE YEARS TO BE ENCLOSED AND FINANCIAL HIGHLIGHTS AND THE KEY PERFORMANCE DURING THE LAST THREE QUARTERS TO BE ENCLOSED AS PER FORMAT:-

COMPANY'S KEY PERFORMANCE

DESCRIPTION	JAN. TO MARCH	APRIL TO JUNE	JULY TO SEPT.
GROSS REVENUE			
PROFIT BEFORE TAX			
PROFIT AFTER TAX			
RETURN ON INVESTED			
CAPITAL (ROIC)			

- D) CUSTOMER SATISFACTION CERTIFICATE FROM ONE SUCH ORGANIZATION IS TO BE ATTACHED WITH THE TECHNICAL BID AND PRICE BID.
- E) NAME AND ADDRESS OF MINIMUM THREE CLIENTS TO WHOM SUCH EQUIPMENT HAVE BEEN SUPPLIED SHOULD BE MENTIONED.
20. **WARRANTY / GUARANTEE:** THIS COMPREHENSIVE WARRANTY / GUARANTEE SHALL REMAIN VALID FOR AT LEAST **12 MONTHS** AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED TO THE FINAL DESTINATION.
21. THE INSTITUTE DOES NOT BIND ITSELF TO OFFER ANY EXPLANATION TO THOSE BIDDERS WHO'S TECHNICAL BID HAS NOT BEEN FOUND ACCEPTABLE BY THE EVALUATION COMMITTEE OF THE INSTITUTE.
22. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO **DR. AYAN ROY CHAUDHURI, MATERIALS SCIENCE CENTRE, INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR - 721 302** AND ACKNOWLEDGEMENT TO BE OBTAINED.

## **IMPORTANT**

1. IIT Kharagpur authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity / upgrade the criteria / drop any item or part thereof at any time before placing the Purchase Order.
2. Promptly make arrangements for repair and / or replacement of any damaged item (s) irrespective of settlement of claim.
3. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.
4. For any query pertaining to this bid document correspondence may be addressed to **Dr. Ayan Roy Chaudhuri**, at the address mentioned above.

### **LAST DATE FOR SUBMISSION OF SEALED BIDS: 10.08.2018**

- 1) Please Note that the Institute remains closed during Saturdays & Sundays and all specified government holidays.
  - 2) Fax, e-mail Tender will not be accepted.
  - 3) The General Terms and Conditions as stated above relate to supply of stores / equipment /assets etc. and for specific service other terms and conditions of the Institute will apply.
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