

 <p>IIT PALAKKAD</p>	<p>भारतीय प्रौद्योगिकी संस्थान पालक्काड Indian Institute of Technology Palakkad अहलिआ एकीकृत कैम्पस, कोज़िपारा Ahalia Integrated Campus, Kozhipara पालक्काड- 678557 Palakkad – 678 557</p>	<p>दूरभाषसंख्या/ Phone no: 04923 – 226 300/590/586</p> <p>ईमेल/ Email : purchase@iitpkd.ac.in</p>
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Prof. Job Kurian
Registrar i/c

Ref : RF/DC/Pulsed DC Sputtering System
Date : 31.01.2018

Open Tender No: IITPKD/CFF/AA/115/2017

Due Date: 21.02.2018 @3.00 PM

Dear Sir/Madam,

On behalf of the **Indian Institute of Technology, Temporary campus, Palakkad, Quotations are invited for “RF/DC/Pulsed DC Sputtering System”**. The Specifications are given in the Annexure.

Technical bid Opening: The Technical bid will be opened on 21.02.2018 at 3.00 PM at Conference Room, Academic Block, IIT Palakkad.

Instructions to the Bidder

- (i) **Preparation of Bids:** - The tenders should be submitted **under two-bid system (i.e.) Technical bid and Financial bid in separate envelopes**. The technical bid should consist of all technical details along with commercial terms and conditions. No prices should be included in technical bid. Financial Bid should indicate item – wise prices for the items mentioned in the technical bid. The technical and the financial bids should be put in separate covers and sealed. Both sealed covers should be put into a bigger cover. **Bids must either be spiral bound / stapled together. No loose sheets will be accepted. All pages must be numbered.**
- (ii) The Quotations duly sealed and superscribed on the envelope **with the reference No. and due date, should be addressed to the undersigned so as to reach on or before the due date stipulated above.**
- (iii) **Delivery of the tender:** - The tender shall be sent to the below-mentioned address either by post or by courier so as to reach this office before the due date and time specified in the Schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule. **The tender box is kept in the office of the Academic Block, IIT Palakkad, Ahalia Integrated Campus, Kozhipara, Palakkad-678 557.**
- (iv) **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. **The Bidders**

representative should carry authorization letter from their company empowering them to participate in the Pre-bid and tender opening meetings. In respect of opening of financial bid, those bidders who are technically qualified only will be called.

- (v) **Prices:** - The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges indicated separately for each item. **The price indicated should be CIF/CIP Kochi.** The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. The price should be quoted without custom duty. **The custom duty will be paid at concessional rate against duty exemption certificate.**

- (vi) **Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. **Terms of Delivery:** - The item should be supplied to our Institute as per Purchase order. The installation and commissioning should be completed as specified **by us in the attached schedule.**

- (vii) **Acceptance & Rejection:** IIT Palakkad reserves the full right to accept / reject any tender at **any** stage without assigning any reason.

Yours sincerely,

Registrar, IIT Palakkad

SCHEDULE

Important Conditions:

- 1) The due date for the submission of the tender is **21.02.2018 @3.00 PM**
- 2) The offers / bids should be submitted in two-bids systems (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes (separately), transportation, packing & forwarding charges, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers **superscribed clearly as "Technical Bid" and "Financial bid"** and sealed. Both the sealed covers should be put in a bigger cover. Open Tender for **"RF/DC/Pulsed DC Sputtering System"** should be written on the left side of the Outer bigger cover and sealed.
- 3) **EMD: -EMD should be at 2% (two percent) of the tender value quoted by the bidder.** The EMD should be enclosed with the financial bid which will not be opened for Technical evaluation. Enclosing the EMD in the Technical bid will automatically **DISQUALIFY** the tenderer. EMD should be in the form of DD in favour of **"Indian Institute of Technology Palakkad" and payable at Palakkad"**. The tender without EMD would be considered as UNSOLICITED and will be REJECTED. Photo/FAX copies of the Demand Draft/Banker's pay orders will not be accepted. No interest will be paid for the EMD and the EMD will be refunded to the successful bidder on receipt of Performance Security.
- 4) **Performance Security:-** The successful bidder will be asked to submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD or FD Receipt from the commercial bank or Bank Guarantee from any nationalized bank of India. **Only after submission of Performance Security, Purchase Order/Work Order will be released / L.C will be opened.**
- 5) **Performance Security in the form of Bank Guarantee:-** In case the successful bidder is a foreign company and wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.
- 6) The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

If an Indian agent is involved, the following documents must be enclosed:

- 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.
 - Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
- 7) The offer/bids should be sent only for **a system or equipment** that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
 - 8) Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
 - 9) Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
 - 10) **Validity:** Validity of Quotation not less than 90 days from the due date of tender.
 - 11) **Delivery Schedule:-** The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
 - 12) **Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
 - 13) **Payment:-** No Advance payment will be made for Indigenous purchase. 100% Payment after supply and successful installation and commissioning and certification by the end user. In case of import supplies the payment will be made only through **100% Letter of Credit i.e. (50% payment will be released against shipping documents and 50% after successful installation and meeting acceptance criteria wherever the installation is being done).**
 - 14) **On-site Installation:** - The equipment or machinery has to be installed and commissioned by the successful bidder within 15 to 20 days from the date of receipt of the **item at site of IIT Palakkad.**
 - 15) **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (For more details please refer our Technical Specifications).

16) Late offer: - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.

17) Loading and unloading charges will be borne by the bidder/Supplier.

18) Acceptance and Rejection: - I.I.T. Palakkad has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

19) Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.

20) Disputes and Jurisdiction: - Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Palakkad in Kerala.

21) All Amendments, time extension, clarifications etc., will be uploaded on the institute website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement:- It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

Technical Specifications for VHV Sputtering System

1.	Overview	
<p>IIT Palakkad requires a Very High Vacuum (VHV) sputtering system with the following key features :</p> <ol style="list-style-type: none"> i. VHV capability with guaranteed chamber pressure as low as 5×10^{-8} Torr. ii. Three sputter guns, all of which can be used either for DC, Pulsed DC or RF Sputtering. iii. Support for reactive sputtering in O₂ rich environment. iv. Three power supplies : one DC, one Pulsed DC one RF supply. The power supplies need to be connected through 4-way swithboxes. 		
2.	Main Vacuum Chamber	
i.	Chamber Type	<ol style="list-style-type: none"> (a) Cylindrical style chamber, material SS 304L, must be electro-polished. (b) Capable of handling Very High Vacuum. Also see point 2 (ix) below. (c) Must have a hinged top lid for ease of access. (d) Non-magnetic. (e) There should be no component/material inside the chamber that is a source of out-gassing.
ii.	Chamber Size	At least 12” Outer Diameter. At least 14” in height.
iii.	Viewports	Two 6” conflat ports with integrated shutters. These shutters must protect the viewport glass from getting coated.
iv.	Other Ports	<ol style="list-style-type: none"> (a) Three ports for gauge heads (b) One port for quartz crystal monitor
v.	Load Lock compatibility	<ol style="list-style-type: none"> (a) Chamber must be designed to work with load-lock (b) Transfer arm must be built into the load-lock chamber / main chamber and should not occupy rack space / add to footprint. Please provide picture of design with proposal.
vi.	Gas Handling	Appropriate feed-trough for Ar, N ₂ and O ₂ gases.
vii.	Spare Ports	<ol style="list-style-type: none"> (a) One 6” conflat port at the bottom of the chamber, in the center, positioned to be at normal incidence to the substrate. (b) One port that will be used in future for a Residual Gas Analyzer (c) One port to allow for future connection to secondary vacuum chamber with in-situ transfer. (d) All unused ports must be sealed shut.
viii.	Quartz Crystal Monitor	<ol style="list-style-type: none"> (a) A single, low profile, quartz crystal sensor, heat sink, controller, oscillator, cable, feedthrough and 10 crystals. (b) Must include rotary feedthrough assembly to allow positioning of crystal in substrate position for deposition calibration.
ix.	Mandatory Future upgrade capability	(a) Chamber must be designed to incorporate RHEED as a future upgrade. It is preferred that RHEED compatibility is achieved without the need for any additional magnetic shielding. However, mumetal shielding is also allowed, in which case appropriate mounting holes must be provided.

		(b) Chamber must be UHV compatible for future upgradability.
3.	Load Lock Chamber	
i	Chamber Construction	(a) Aluminum/SS 304L chamber body
		(b) VAT or equivalent make Gate valve of flange size appropriate to connect the main deposition chamber and the load lock chamber via the transfer arm
		(c) The load-lock chamber should be fitted with vent-valve, and suitable ports for mounting rough vacuum and vacuum pressure sensors, etc.
		(d) Must have at least two viewports.
4.	Vacuum Pumping and Measurement	
i.	Main Chamber Pumping	(a) Pfeiffer/Edwards/Leybold or substantially equivalent make turbo molecular pump with pumping speed ≥ 250 l/s. All necessary accessories like purge/vent valve need to be included.
		(b) Pfeiffer/Leybold /Alcatel or substantially equivalent make > 8 cfm dry mechnacial pump for roughing and for backing of turbomolecular pump. This pump must come with an integral anti-suckback valve.
		(c) System must support N ₂ purging to allow for reactive sputtering with O ₂ .
		(d) All interconnecting plumbing and hardware must be included.
ii.	Load Lock Pumping	(a) Pfeiffer/Edwards/Leybold or substantially equivalent make turbo-molecular pump with delayed vent valve and Turbo controller and pumping speed ≥ 80 lps for load lock chamber.
		(b) Pfeiffer/Leybold/Alcatel or substantially equivalent make Dry pump with appropriate technical specifications so as to be compatible with backing the turbo pump of the load-lock chamber
iii.	Main Chamber Vacuum measurement	(a) High Pressure range (atm pressure to 10^{-3} Torr) using a Pirani gauge (MKS Convectron or substantially equivalent).
		(b) Capacitance Manometer (MKS Baratron or substantially equivalent) to monitor the sputtering process
		(c) Low Pressure range (10^{-2} Torr to 10^{-10} Torr) using an ionization gauge (MKS Nude Ion or substantially equivalent).
		(d) Associated read-out modules of gauges must be of digital type.
		(e) Vacuum Gauge controller included with system must be able to interface with upto three gauge heads.
iv.	Load Lock Vacuum measurement	Full range vacuum gauge
v.	Vacuum Valves & Pressure Control	(a) Required base pressure 5×10^{-8} Torr
		(b) VAT/Equivalent automatic pressure control for isolation and throttling.

		(c) Automatic delayed vent valve for the turbopump
		(d) Electro-pneumatically/manually operated valve for venting chamber.
		(e) System must be designed for downstream pressure control. Flow diagram must be provided.
vi.	Accessories	All accessories including cables, chillers etc. for the vacuum system must be included.
5.	Sputtering Guns	
i.	Configuration	(a) System must include at least three UHV compatible 2” or 3” confocal magnetron sputtering guns with chimney, pneumatic shutter, and gas injection capability. All associated fixtures for mounting etc must be provided.
		(b) Confocal geometry for “Sputter Up” configuration required.
		(c) All sputtering guns must have modular magnet design to allow balanced, unbalanced, and magnetic material configurations.
		(d) All sputtering guns should be able to accommodate up to 0.125” thick magnetic targets (including pure iron) without modification. Design with dedicated gun for magnetic materials is not acceptable.
		(e) In case water cooling of guns is required, appropriate stainless steel piping must be included.
		(f) All sputtering guns must support RF, DC and pulsed DC operation.
		(g) Magnets must be located in vacuum, outside of cooling water, with Curie point of 200C
ii.	Mandatory Future upgrade capability	System must be capable of accommodating a total of at least five 2” or 3” sputtering guns.
6.	Substrate Holder	
i.	Size of samples	Substrate holder platform and associated fixtures must accommodate either one number of 4” wafer / multiple number of 2” wafers / small dies down to 1 cm x 1cm.
ii.	Substrate Rotation	(a) System must have capability to rotate substrate at a uniform adjustable speed between 0-30 RPM.
		(b) System must use a ferrofluidic rotary feedthrough or substantially equivalent technology for power, sensor data, cooling-water etc.
iii.	Substrate Heating	(a) Upto 850C using quartz lamps is required
		(b) Must have a PID based controller to control the temperature of the substrate.
		(c) Over-temperature protection with +/- 1 deg C stability.
iv.	Rated for reactive environment	(a) The substrate heating system must be rated to work in an O ₂ rich environment.
		(b) Must have a substrate gas ring to allow for reactive sputtering.

v.	Height Adjust	At least 2” z-motion to adjust the distance between the target and the substrate.
vi.	Substrate Biasing	Capability to bias the substrate with RF and DC required. No special power supply should be needed for this.
7.	Sputtering Power Supplies	
i.	DC Supply	(a) Quantity : 1
		(b) At least 750 W DC, At least 1000 V output
		(c) Must be connected via an integrated 4-way switchbox to allow for easy connection to any one of the sputtering guns.
ii.	Pulsed DC Supply	(a) Quantity : 1
		(b) At least 2kW output power, at least 800V output voltage, 0-100 kHz Output frequency.
		(c) Must be connected via an integrated 4-way switchbox to allow for easy connection to any one of the sputtering guns.
iii.	RF power supply	(a) Quantity : 1
		(b) At least 300 W RF supply (nominal frequency 13.56 MHz) with manual matching network.
		(c) Must be connected via an integrated 4-way switchbox to allow for easy connection to any one of the sputtering guns.
8.	Gas Handling	
i.	Ar	(a) MKS (or substantially equivalent) Mass Flow Controller with flow rate upto 20 sccm.
		(b) Ar gas line must be plumbed to at-least one sputter source.
ii.	O2	(a) MKS (or substantially equivalent) Mass Flow Controller with flow rate upto 10 sccm.
		(b) Reactive gas line must be plumbed to the substrate gas ring.
iii.	N2	(a) MKS (or substantially equivalent) Mass Flow Controller with flow rate upto 20 sccm.
iv.	Mandatory Future upgrade capability	System and software should allow for adding one more MFC (for a total of four MFCs).
9.	Computer System Control	
i.	Interfacing	(a) Computer system must interface with at least (4) DC & (4) RF generators for control of output mode, setpoint, ramping & plasma detection
		(b) Interfaces directly with solenoid pneumatics manifold, for control of shutters, gas isolation valves.
		(c) Interfaces with main valve for: open / closed / throttle position
		(d) Interfaces with Substrate Holder closed-loop PID heater controller for: on / off / temp. setpoint
		(e) Interfaces with substrate rotation controller (On/Off Mode)
ii.	Recipe handling	(a) Define and stack process layers to create processes
		(b) Stores and runs processes
		(c) Multiple password protected accounts for process layer &

		process security
		(d) remote recipe creation from outside lab must be supported
iii.	Logging	Displays and data logs: shutter position / DC power feedback / Pulse Frequency and Reverse Time / DC bias feedback (for RF) / plasma verification / process pressure / gas flow feedback / temperature feedback / target kW hours / Abort Notifications
iv.	Computer	A laptop computer (min spec Intel i5 processor, 8GB RAM, 1 TB HDD) should be provided for full computer control.
10.	Power Distribution & Safety Interlocks	
i.	Mains Supply	Sputtering system must work on either a 3 phase 415 V 50Hz supply OR 1 phase 230 V 50 Hz supply.
ii.	Power Failure	In case of sudden power failures, suitable protective devices must ensure that the system remains undamaged.
iii.	Power Distribution	Wiring must be from a dedicated distribution board located at the rear of the system
iv.	Interlocks	Must include safety interlocks for water, vacuum and high voltage.
11.	Closed Loop Chiller Closed-Loop Chiller with temperature range range 5C to 40C and Temperature Stability +/- 0.1 C must be included.	
12.	System Guarantee expected (a) Base Vacuum: better than or equal to 5.0×10^{-8} Torr (b) Deposition Uniformity: better than +/- 2.5% over a 4" diameter wafer - 5 mm edge exclusion with RF deposited SiO ₂ or reactively deposited TiN. Proof of similar performance achieved with a similar system must be presented as part of the technical bid.	
13.	Targets : <i>Mandatory item :</i> The following targets (of size compatible with sputtering gun) must be quoted as a separate item (price will be used in financial comparison). Targets must be from Kurt J. Lesker (or equivalently reputable) company. i. Silicon Oxide (99.995% purity or better), 0.125" thick (or higher) : 1 Number <i>Optional item :</i> The following targets (of size compatible with sputtering gun) must be quoted as a separate item. Targets must be from Kurt J. Lesker (or equivalently reputable) company. i. Hafnium Oxide (99.95% purity or better), 0.125" thick (or higher) : 1 Number ii. Aluminum Oxide (99.995% purity or better), 0.125" thick (or higher) : 1 Number	
14.	Warranty : Service and warranty for a minimum period of three years for the equipment must be provided. AMC for additional three years must be quoted separately.	

Who can participate in the bid?

Only those bidders fulfilling the following criteria should respond to the tender.

1. The bidder should be either an Original Equipment Manufacturer (OEM) of RF Sputtering systems or should be an authorized representative (provide documentary proof) of an OEM.
2. Either the bidder can bid on behalf of the Principal/OEM or Principal/OEM itself can bid, but both cannot simultaneously bid for the same item. Also, if the bidder submits a bid on behalf of a particular Principal/OEM, the same bidder cannot submit another bid on behalf of another Principal/OEM in the same tender for the same item. However, the bidder can submit bids for multiple items from the same Principal/OEM.
3. The bidder should be a company registered under the Companies Act, 1956/2013 OR a Limited Liability Partnership/ a registered partnership firm OR a sole-proprietorship entity. Appropriate Registration incorporation certificate must be submitted.
4. The bidder must have a registered office in Karnataka/TamilNadu/Telangana/Andhra Pradesh/Maharashtra or Kerala. Certificate of registration for the offices to be provided.
5. The bidder must also have a service center in Karnataka/Tamil Nadu/ Telangana/Andhra Pradesh/Maharashtra or Kerala. Certificate of registration for the centers to be provided. Details about scope of service activities provided by the service centres must be provided. The contact details of the service engineers must be provided.
6. The bidder must be in existence in the business of RF Sputtering systems or allied fields for a minimum period of 5 previous financial years (before or since 01 April 2012). Documentary evidences of experience must be provided.
7. The bidder should have implemented orders of RF Sputtering systems worth exceeding INR **50 Lakh** during previous three financial years (01 April 2014 – 31 March 2017). Copies of the most recent purchase orders and certificates of successful implementation must be included. Copies of financial statements or evidence of turnover must be furnished.
8. The bidder should have documentary evidence of having supplied at least 4 No. of RF Sputtering systems to a Centrally Funded Technical Institution (e.g., IIT, NIT, IISc, IISER, etc.) in the recent past. The bidder must provide a certificate of satisfactory performance of the supplied equipment from the institute to which they have recently supplied. Contact details of the faculty-in-charge of the installed setup must also be provided.
9. The bidder must provide detailed specification of each equipment/item. Model numbers, data sheets and brochures must be included for each quoted equipment/accessories/item. Specifications corresponding to quoted model number must be available publicly via OEM's website for scrutiny. If not, bid can be disqualified on technical grounds.
10. The purchase committee at IIT Palakkad reserves the right to ask for photographs/CAD drawings/flow diagrams of sub-assemblies (such as sputtering guns, main chamber, load-lock chamber etc.) to satisfy themselves of the proven capabilities of the bidder in manufacturing systems similar to the one that is being specified here. The bidder must provide these details within two working days of receiving such a request via email. Decision regarding technical compliance of the bidder can be taken on the basis of these photographs/CAD drawings/flow diagrams.
- 11. Compliance sheet for the technical specification and OEM Brochure have to be attached along with the Technical bid. Vendor has to fill the compliance sheet and mention page number or reference number in OEM brochure. Unfilled / partially filled sheets lead to disqualification.**
- 12. Service and warranty for a minimum period of three years for the equipment must be provided. AMC for additional three years must be quoted separately.**