IIT PALAKKAD

भारतीय प्रौद्योगिकी संस्थान पालक्काड
Indian Institute of Technology Palakkad
अहलिआ एकीकृत कैम्पस, कोज़्हिपारा
Ahalia Integrated Campus, Kozhipara
पालक्काड- 678557
Palakkad – 678 557

दूरभाषसंख्या/ Phone no:
04923 – 226 300/590/586

ईमेल/ Email :
purchase@iitpkd.ac.in

Prof. Job Kurian
Registrar i/c

Ref : X-ray Diffractometer with temperature variation up to 1500^{0}C
Date : 22.12.2017

Open Tender No: IITPKD/CIF/JB/088/2017 **Due Date: 12.01.2018 AT 10.30 AM**

Dear Sir/Madam,

On behalf of the **Indian Institute of Technology, Temporary campus, Palakkad, Quotations are invited for " Computer controlled X-ray Diffractometer system with temperature variation up to 1500^{0}C "**. The Specifications are given in the Annexure.

Pre-bid meeting – The Pre-bid meeting is scheduled to be held on 28.12.2017 at 10.00 AM in the Conference Room, Academic Block, IIT Palakkad.

Technical bid Opening: The Technical bid will be opened on 12.01.2018 at 10.30 AM at 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 Bidder's 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. T**he 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 **Due Date: 12.01.2018 AT 10.30 AM**

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 **" Computer controlled X-ray Diffractometer system with temperature variation up to 1500^{0}C "** 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:-** Incase 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). Advance payment may be considered on submission of Bank Guarantee equal to the amount of advance payment.**

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

TENDER SPECIFICATIONS FOR THE PROCUREMENT OF XRD SYSTEM
INDIAN INSTITUTE OF TECHNOLOGY - PALAKKAD

Quotations are invited for the supply, installation and commissioning of the following instrument:

Computer controlled X-ray Diffractometer System with the minimum features listed below:

High resolution X-ray diffractometer (XRD) fully software controlled and capable of carrying out structural characterization on bulk, powder, thin films and nanomaterials, with the following specifications:

I. X-ray Generator

i) Output Power: 6.0 kW or higher
ii) Maximum voltage: 45 kV
iii) Voltgae Step width = 1 kV
iv) Maximum current: 110 mA (or higher)
v) Current step width = 1mA
vi) Stability: ± 0.01 % or better against ± 10 % voltage fluctuation
vii) Control: Fully controlled by software
viii) Overload limit setting, Automatic ageing of X-ray tube and X-ray tube protection against under voltage, over load, over voltage, over current and/or failure of water supply. Should have door interlock safety mechanism which allows the generation of x-rays only when the door is closed.

II. X-ray Tube

i. Cu (Rotating Anode) with appropriate filter
ii. Co (Rotating Anode) with appropriate filter

The system should allow easy exchange of X-ray source between Cu and Co target by users. Any alignment required after target change should be automatic

III. Goniometer

(a) The goniometer should be a vertically mounted. It should have the capability of carrying out the complete analysis of bulk, powder and thin films (4 circle geometry or similar) samples. All accessories required for reciprocal space mapping with appropriate software should be quoted. The system should allow residual stress and pole figure analysis of metallic/superalloys. Should have Automatic alignment when the mode of operation is changed.

i. Type: Theta – Theta (θ- θ)
ii. 2 θ range – 0 to 160 degrees or better
iii. Minimum step size: 0.0001 degree or smaller
iv. Angle reproducibility: 0.0001 degree or smaller
v. Resolution: 0.05 degrees or better
vi. 4-axis attachment for analysis of thin/textured films

vii. Sample height alignment unit with Sample Up/down mechanism

(b) In-plane Goniometer:

i. Scanning axis (driving method): Horizontal 2θChi (Pulse motor drive)
ii. Scanning speed: 2θChi independent 0.01 ~ 40deg./min
iii. Step width: 2θChi independent- 0.002 deg.
iv. Scanning range: -3 ~ 120deg. (2θChi)

(c) Standard measurement software:

The software should be able to perform

i. X-Ray Generator Operation.
ii. Manual Measurement.
iii. Auto setting (with counting loss correction Function).
iv. Standard measurement.
v. Automatic Alignment.
vi. System Conditioning setting (Change configurations).
vii. Measuring Monitor and ASCII Output.
viii. Determine which optical modules are best for an application, and perform automatic alignment, setup and measurement. Should deliver a completely automated measurement sequence.

(d) Data processing software (Academic License). The details of the software functionalities should be clearly specified in the tender document

(e) Analysis Software that allows both qualitative and comprehensive analysis. Should include (but not limited to) lattice constants, Crystallinity, Indexing. The details of the software functionalities should be clearly specified in the tender document

(f) Software for Rietveld refinement. The details of the software functionalities should be clearly specified in the tender document

IV. Thin film attachment with appropriate software for thin film analysis

i. should allow XRD of multilayer thin films. Should work in both reflection and transmission mode.
ii. Phi Axis- Operating range -360 to +360deg with minimum 0.005 degree Step or better
iii. Kai Axis-Operating range -5 to 92 deg with minimum 0.002 degree Step or better
iv. Z Axis- Operational Range -6 to +1mm range with minimum 0.00025mm Step or better
v. Thin Film Slit
vi. Appropriate Rx Ry stage for rocking curve.
vii. Should allow high resolution and high intensity X-ray reflectivity studies (Thin film and SAXS)
viii. Appropriate thin film analysis software

V. Optics:

i) Computer controlled automatic Slits (divergence, scattering, receiving and height slits) and Slit Exchanger system with automatic alignment and control with automatic systematic error correction. The arrangement should facilitate small angle (~0.5 degree) measurements.

ii) The vendor should include all the relevant slits including slits for high resolution focusing method (Incident and receiving soller slits).

iii) Two bounce monochromators both at primary and secondary beam sides. For parallel beam optics: (i) Ge(220) two bounce crystal for Cu kα in the incident path with the divergence of the exit beam should be below 0.01 degree. All crystals should have motor controlled rotation adjustments.

iv) Appropriate optics (mirror systems) that can support Cu/Co dual wavelength and facilitate measurements with Bragg-Brentano as well as parallel beam optics with quick changeover between the two modes without manual realignment.

v) Accessories for analyzing epitaxial thin films.

vi) Ni filter for Cu source

VI. Small angle x-ray scattering (SAXS) attachment with appropriate software.

VII. High Temperature Attachment:

1. Operating Temperature: Ambient to 1500 deg C in Air. The vendor should specify the operating temperature range for sample in vacuum and in inert gas environment.
2. Xray Window-Al coated Kapton
3. Thermocouple-JIS Type (2)
4. Sample Size- 13.5X25X0.5mm or larger
5. Details of Thermocouple and Temperature Controller should be provided
6. Vacuum Pump –vacuum level of 10^{-3} mbar or better

VIII. Residual Stress Optics with Software

IX. PDXL Pole Figure and RSM Software

X. Detector

i) Scintillation (0-D) detector (point detector) for high-resolution data collection

ii) Semiconductor strip 1D detectors for fast data collection.

iii) Detectors should have high resolution, lower dead time and high precision.

XI. Computer Controls A desktop PC with latest configuration for all operations of the XRD with Windows operating system.

XII. Software: In addition to the listed software (s) in this specification document, all necessary and essential additional software, if any, required for the smooth functioning of the equipment as well as for data analysis should be quoted by the vendor. The software (s) provided should be capable of

(i) providing simultaneous diffractometer control, data collection, data analysis, peak search, search-match, profile fitting, pattern treatment like background subtraction, data smoothening, kα2 stripping, conversion from one data format to another, etc.

(ii) Analysis software should be capable of carrying out profile analysis, quantitative phase analysis, Rietveld refinement, lattice constant estimation, thin films analysis, reflectivity, rocking curve, SAXS, residual stress analysis, pole figure analysis etc – minimum 15 licenses should be provided.

(iii) ICDD PDF2 software should be part of the package. Should allow installation in multiple user computers.

XIII. Additional accessories/requirements.

i) Multi sample holder – at least 6 samples or more that can work in both reflection and transmission modes

ii) Low Background Sample Holder (A set of 2)

iii) Glass and aluminum sample holder (20 each)

iv) The vendor should quote for the necessary water chilling - Werner Finley Chiller of appropriate capacity for the main system and a separate small chiller unit of appropriate capacity for the temperature chamber. Pumping system needed for the smooth operation and extended lifetime of the anode.

v) Servicing of the rotating anode source including all UHV and moving parts and the equipment as whole for at least five years after purchase of the system should be included in the purchase order – the vendor should provide the spare parts required for the servicing of the equipment for the next five years.

vi) Any other item including power requirements essential for the installation of the system should be mentioned in the quote.

XIV. Optional Items:

i. 2D detectors for fast data collections

ii. 4 bounce monochromators.

iii. High Temperature attachment (ambient to 1500 deg C) with vacuum level of 10^{-6} mbar or better

XV. SPARES

LAMP indication for X-ray ON, Water filter, Tube filter, Microswitches for shutter, Relay switches for shutter, Microswitch for the main doors, silicone grease, and all other necessary spares for the smooth running of the X-ray diffractometer for a minimum of 5 years.

XVI. SAFETY should conform to international safety standards and regulations pertaining to X-ray radiation and other hazards. Vendor should provide the necessary certification confirming the above safety requirements.

XVII. Warranty: Minimum 3 years warranty should be provided. AMC for additional 3 years after the warranty period.

XVIII. Technical Bid should also contain Following Information along with All the Technical Details: 1) Number of installations of such equipment in India (There must be at least Three such installations) 2) Technical Support in India 3) Number of installations of such systems worldwide.

XIX. Acceptance Criteria: Supply of the equipment as per the specification with all the accessories and modes specified, quality of installation and training and Performance during the inspection above will be the acceptance criteria. The vendor should demonstrate all the functionalities of the equipment as per the PO on standard samples.

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 Computer controlled X-ray Diffractometer System or should be an authorized representative (provide documentary proof) of an OEM.

2. 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.

3. The bidder must have a registered office in Karnataka/Tamil Nadu/Telangana/Andhra Pradesh/Maharashtra or Kerala. Certificate of registration for the offices to be provided.

4. The bidder must also have a service center in Karnataka/Tamil Nadu/ Telangana/Andhra Pradesh 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.

5. The bidder must be in existence in the business of supplying Computer controlled X-ray Diffractometer System for a minimum period of 5 previous financial years (before or since 01 April 2012). Documentary evidences of experience must be provided.

6. The bidder should have implemented orders of Computer controlled X-ray Diffractometer System worth exceeding INR **100 Lakhs** 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.

7. The bidder should have documentary evidence of having supplied at least 2 No. of Computer controlled X-ray Diffractometer System 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.

8. 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.

9. The bidder must provide detailed specification of each equipment/item. Model numbers, data sheets and brochures must be included for all equipment quoted, system

and all accessories. 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. 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.