

GOVERNMENT COLLEGE UNIVERSITY FAISALABAD



TENDER DOCUMENT No. 01/2021

Supply of Lab Equipment for (SPREL) Department of Physics under PAK-UK ICRG-2020 Reference No. 006327/D/ISB/008/2021 titled “The bifacial field effect passivation of dielectric AlOx/SiNx stacks in PERC solar cells for improved performance”.

Tender Fee: Rs. 1000/-

Sealed Tenders are invited from the well reputed firms / suppliers, who are registered with Tax Departments for supply of Lab Equipment for Semiconductor Physics and Renewable Energy Laboratory under PAK-UK ICRG-2020 Reference No. 006327/D/ISB/008/2021 titled “**The bifacial field effect passivation of dielectric AlOx/SiNx stacks in PERC solar cells for improved performance**” at Department of Physics, GCUF.

GENERAL TERMS & CONDITIONS

1. Tender Opening Date & Procedure:

- 1.1 The procurement shall be completed in accordance with Punjab Procurement Rules 2014, on **Single Stage - Two Envelope** Bidding Procedure.
- 1.2 Bids in complete conformity with Tender Documents will be dropped in Tender Box placed at the office of undersigned, not later than **08-03-2022** on **11:00 A.M** which shall be opened on same day at **11:30 A.M** in Department of Physics.

Note:

- Tender Number must be mentioned on envelope.
- Both Technical and financial proposal shall be written on the letter head of the company/ firm alongwith other prescribed documents.

2. Tender Fee, Bid Security and Performance Security:

- 2.1 The Bid must be accompanied by Tender Fee of Rs:1000/- (non refundable) in shape of Call Deposit Receipt (CDR) in original and Bid Security of 2% of Estimated Price of Rs.13,600,000/- (refundable) in shape of Call Deposit Receipt (CDR) in original. CDRs must be in favor of Treasurer, Government College University, Faisalabad.
- 2.2 The successful bidder shall submit performance security @ 10% of their quoted bid before issuance of supply order which shall be released after successful completion of warranty period.

3. Terms of Technical & Financial Proposal

- 3.1 The bidder should read carefully “Equipment Description and Specifications” before preparing Technical and Financial Proposals.
- 3.2 The Bidders are required to submit their financial proposals in foreign currency e.g.USD, EURO, POUND etc. on the basis of Cost, Insurance & Freight (CIF) value inclusive of all clearance charges, L/C charges (e.g. opening, amendment, release, and cancellation), local carriage charges etc till delivery of equipment(s) at GCUF.

- 3.3 For price comparison, the prices quoted in foreign currency will be converted to PKR, for which the State Bank of Pakistan forex rate (Interbank-Selling) on the day of financial bid opening will be considered.
- 3.4 Letters for custom duty / excise duty / sales tax / other surcharge exemptions will be issued on the provision of Airway Bill (AWB) / Bill of Lading (BL), country of origin, credentials of clearing agent etc, wherever applicable. At least 10 working days will be required to provide the said documents to the vendor, therefore the request for the provision of exemption certificates, endorsed AWB / BL and approved EIF should be sent accordingly.
- 3.5 The quoted price should be item wise. The vendor may quote all items or partial items. However, the comparison of price will be made on the basis of each item and purchase order / contract agreement will also be awarded accordingly.
- 3.6 The bidder should quote single option of each item which may be equivalent to or higher than the required specifications. No alternative / multiple options will be accepted. The mentioned brand / trade name within the tender document are for reference / quality control, any item equivalent / compatible to that can be quoted.
- 3.7 Any term & condition written in technical or financial offer that is in conflict / contrary / conditional to the terms and conditions laid down in the said tender document will be considered null and void. Participation in the tender will mean that the bidder has accepted the terms and conditions of tender documents.

4. Validity of Offers and Mode of Import:

- 4.1 Offers shall be valid for 180 days from the closing date of submission of bids.
- 4.2 Withdrawal / modification of the original offer within the validity period shall entitle the University to forfeit Bid Security.
- 4.3 Sales Tax Number and NTN Number must be mentioned clearly on the letter head/ cover letter/ bidding documents.
- 4.4 The GCUF reserves the right to delete or decrease quantities as well as suspend / cancel whole tender / purchase order/ contract agreement or any part of it, without assigning any reason thereof and without any obligation what so ever.
- 4.5 The University reserves the right to reject all bids / proposals at any time prior to the acceptance of bids or proposals as provided under Rule-35 of Punjab Procurement Rules 2014. However, upon bidder's request the ground of rejection will be communicated to the concerned but no justification will be given as per PPRA Rule 35(2).
- 4.6 The equipments should be quoted through **LC on Usance Basis** (60 days credit from the AWB Date), the vendor will request GCUF to establish LC (Usance Basis) on the name of his principal(s) by providing the original proforma invoice(s) containing the Description of item(s), Price, HS Code, Country of origin, Beneficiary's bank details etc along with original insurance documents and premium paid receipt within 15 days of issuance of purchase order / contract agreement.

5. Failures and Terminations:

No offer of a supplier / firm will be considered if:-

- 5.1 Bid received is either without Tender Fee / Bid Security / CDR or with Tender Fee / Bid Security / CDR less than the required.
- 5.2 Bid received is not in accordance with Tender Document, Tender Notice or Tender Specifications.
- 5.3 Bid received later than the date and time fixed for tender.

- 5.4 Bid / offer received is incomplete in any respect or unsigned.
- 5.5 Bid / offer received is ambiguous and / or conditional.
- 5.6 Bid / offer received from a firm which is black listed at any level.
- 5.7 Bid in which any erasing / cutting / overwriting etc. is observed.
- 5.8 Purchase order/ contract agreement will be terminated, if the vendor / supplier fails to deliver the item(s) without plausible explanation within specified delivery period or the supplied items are not in accordance with the specifications as laid down in the Tender Document / Technical Bid / Purchase Order/ Contract Agreement.
- 5.9 If situation warranted, then University is authorized to forfeit the Bid and / or Performance Security and the firm may also be black listed.
- 5.10 For acceptance of bids for equipment, bidders shall meet the Mandatory Requirements and Technical Specifications.

6. Other Special Conditions:

Following requirements define the scope of work of this Tender:

- 6.1 In case of any conflict, the decision of the Vice Chancellor of Government College University, Faisalabad, would be final & binding on both the parties.
- 6.2 The vendor must ensure that the supplied items are new, in proper shape and meet the technical specifications.
- 6.3 The vendor will be responsible for the supply, installation, commissioning of scientific equipments along with on campus training (if applicable).
- 6.4 The bidder shall provide Company profile, Authorization with Principal firm(s), Company experience in related field, "Equipment Technical Details (brochures, etc.)" by clearly mentioning the Specifications, Brand / Principal Manufacturer Name and Its Origin (Country), Model / Part Number, Origin (Product's Country of Origin), Valid Manufacturer's Authorization Form (MAF), Manufacturing Year etc.
- 6.5 The vendor shall provide comprehensive documentation of system deployed including diagrams, configuration and manuals etc at the time of installation and commissioning.
- 6.6 The vendor / supplier shall be responsible of providing services for operation and maintenance of the item provided, without any extra cost or hidden charges within warranty period.
- 6.7 In case of equipment against which only one financial bid receives / matures, market survey as per PPRA guidelines will be carried out.
- 6.8 The vendor is responsible to provide import documents (AWB or BL, custom clearance documents, packing list, country of origin etc.) wherever applicable, along with invoice, Sales tax invoice (wherever applicable) and delivery challan for timely release of payment.
- 6.9 Warranty period will be at least one year or standard warranty or as demanded within specifications (whatever is more). Warranty period will be considered from the date of equipment commissioning / installation (not from date of delivery).
- 6.10 Custom clearance and transportation to destinations within GCUF campuses will be the sole responsibility of the vendor.

7. Terms of Delivery and Payment:

- 7.1 In case of LC on Usance basis (60 days credit from the AWB Date), the payment will be made to the principal supplier after 60 days of AWB date subject to delivery, inspection and installation of equipment as per GCUF requirement and on the provision of original non-deficient and non-discrepant documents by the beneficiary's bank. Any difference of amount due to change in exchange rate (difference that has arisen in the exchange rate mentioned in the purchase order / contract agreement and exchange rate of the day actual payment has been made by the bank) will be payable by the local vendor, accordingly.

- 7.2 In case of open account / credit, the payment will be made to the principal supplier within 30 working days subject to delivery, inspection and installation of equipment as per GCUF requirement and on the provision of original non-deficient and non-discrepant documents by the beneficiary's bank. Any difference of amount due to change in exchange rate (difference that has arisen in the exchange rate mentioned in the purchase order / contract agreement and exchange rate of the day actual payment has been made by the bank) will be payable by the local vendor, accordingly.
- 7.3 In case of items imported through LC, delivery time will be within 120 days from the issuance of Purchase / Supply Order / Contract Agreement or till the expiry of subject LC (whichever comes first). Otherwise, 2% penalty per month (not exceeding 10%) of the cost of item(s) will be imposed if not supplied within stipulated period. This period includes the time required for the establishment of Letter of Credit (LC) by the University bank. Any delay in the timely submission of required documents (as detailed above) / amendments in LC documents, will be on the part of vendor and will not automatically increase the duration of delivery time as given above. For extension in delivery time, the request by the vendor should be submitted 15 days before the expiry of delivery time as per Purchase / Contract Agreement, explaining the reasons of delay. Any such request will be considered after due deliberation and any additional charges along with penalty (if imposed) will be payable by the vendor.
- 7.4 No claim of payment for any additional charges than the Purchase / Contract Agreement, on the name of change in Govt. duties, provincial revenue / taxes, transportation, installation charges will be entertained.
- 7.5 All duties (Stamp paper duty etc) and taxes will be payable by the vendor as per applicable Government rules.

8. Liquidated Damages:

- 8.1 In case of delay, 2% penalty per month (not exceeding 10%) of the cost of item(s) will be imposed if not supplied within stipulated period.
- 8.2 For the determination of LD charges, the duration between the last date of delivery as per purchase / supply order / contract agreement / extended delivery date and the day equipment has received at GCUF campuses will be considered as described above.
- 8.3 The supplied items and their accessories should be as per bid specifications otherwise it will be rejected and returned at vendor's cost.
- 8.4 In case the vendor fails to arrange the shipment of the goods within the original validity of the L/C or Purchase Order / Contract Agreement, request to extend / amend the L/C or Purchase Order/ Contract Agreement should be submitted 15 days before the L/C or Purchase Order expiry, explaining the reasons of delay. Any such request will be considered after due deliberation and any additional charges along with penalty (if imposed) will be payable by the vendor.
- 8.5 After the issuance of Purchase Order/ Contract Agreement, if the vendor is unable / regret to deliver the item(s), performance security of amount of regretted item(s) will be forfeited.

Dr. Sofia Akbar Tahir

Principal Investigator

ReferenceNo.

006327/D/ISB/008/2021

Department of Physics

Government College University, Faisalabad

TENDER DOCUMENT No. 01/2021

Sr. No.	Item	Specification OR Equivalent	Quantity	Unit Price including taxes (PKR)	Total Price
1	Atomic layer deposition (ALD) system, Model: AT-410 or Equivalent	Material: Al₂O₃ Maximum size - Up to 4" diameter samples - Porous materials, materials with high aspect ratio features and 3-D substrates up to 11mm tall. System - Small form factor table-top ALD system - PLC controlled with 16-bit 7" High Resolution Color Touchscreen Interface. - Ultra small foot print: <0.15m³ and fits easily on any standard bench or table top. No separate computer to accommodate either. - No elastomer o-rings present near or upstream of deposition zone. - Clean room compatible. Deposition System: Deposition Chamber(s) - Hot wall deposition chamber compatible for metal oxide, metal nitride, sulfide and pure metal processes. - Deposition chamber utilizes a metal sealed, point source precursor inlet upstream and a large vacuum port outlet downstream, with the sample introduction door, further downstream. - Separate flow paths for metal sources and counter reactants. - Flow optimized deposition chamber with minimized chamber volume: - Chamber volume <750 cubic	01		

- | | | | | | |
|--|--|---|--|--|--|
| | | <p>centimeters</p> <ol style="list-style-type: none"> Computer controlled standard deposition temperature range up to 315-degree C with an accuracy of $\pm 1^{\circ}\text{C}$. Chamber machined from semiconductor grade 6061-T6 aluminum. Deposition chamber heat up times (<10 min from 100°C to 200°C) and cool down times (<15 min from 200°C to 100°C) Fully automated temperature control system for bottles, dose volumes, precursor delivery manifold and chamber Edwards E2M18F Mechanical Direct Drive Pump for PFPE oil <ul style="list-style-type: none"> - 335 L/M, 12.1 CFM (pumping speed) - 2 Stage, Single Phase, .75 HP - Flomblin included <p>Precursor Sources</p> <ol style="list-style-type: none"> Total of five (5) precursor sources installed simultaneously <ol style="list-style-type: none"> Two (2) counter reactants like H_2O or H_2S. Three (3) metal sources like trimethylaluminum Up to three (3) of the metal sources can be heated with optional Custom, conformal heating jacket for temperatures up to 140°C. <p>Precursor Lines</p> <ol style="list-style-type: none"> All organometallic sources pass through a path within the gas distribution manifold separate from oxidants and reductants to minimize chemical cross talk or cross-contamination during deposition processes. | | | |
|--|--|---|--|--|--|

2. Prevents cross-contamination and reaction between precursors before they enter the reaction chamber.
3. Defined Dose Volume Pulsing (DDVP): The dose of each precursor into the deposition chamber is determined by the precursor temperature and a fixed volume between the precursor valve and the dose valve for each source.
4. Three-way thermal ALD valves after dose volume for fast pulsing, high reliability
5. All Source Lines are electro polished stainless steel tubes with metal sealed VCR fittings.
6. Fujikin metal sealed, 200 sccm MFC for N₂ or Ar purge flow control
7. Model 330040 POSI-TRAP 4 with NW-20 ports
8. -Activated charcoal filter installed for precursor abatement
9. 3ft NW25 SS bellows hose to connect vac inlet to AT400

Cycling capability

1. 6-10 cycles/min or up to 1.2nm/min of Al₂O₃

Heated Source Delivery System

1. Capable of delivering low vapor pressure liquid, solid (> 10 mbar) at variable source temperatures.
2. Source heating temperature range up to 145°C with ±1 °C accuracy.
3. Compatible with thermally stable metal chemicals including metal halides, metal-organic compounds and organometallic chemicals.
4. Stainless Steel container

		volume up to 50 ml. 5. VCR Metal Sealed gas flow system. 6. Easy to use and change container. Safety 1. Vacuum switch and separate capacitance manometer pressure measurement to insure system is under vacuum during processing. 2. Hardware interlock for overheating; two temperature sensors on chamber with one acting as the failsafe for the main control sensor. 3. Bottle over heat software interlocks. 4. Physical emergency off (EMO) button on front panel. 5. Normally closed pneumatic valves (all valves will be closed in the event of a system failure or EMO) 6. All exterior surfaces are touch safe. Automated Flow Control 1. Exhaust line is equipped with a HMI-controlled pneumatic valve and the deposition chamber is evacuated and vented via HMI. Precursors 1. Trimethylaluminium 25g filled in Precursor bottle (Qty. 02) 2. Nitrogen Gas Cylinder with 2 stage Regulator (Qty 01) 3. 50cc SS precursor bottle (No valve) For H2O (Qty 01)			
2	PECVD Furnace KJ-T1200 or Equivalent	Specifications • PE-CVD Tube Furnace • 600W RF power supply • Working Temp. <= 1100C • Tube size: OD220*1500mm • Hot zone: 440mm • 6L/S oil-less pump + 600L/S	01		

		molecular pump composite digital vacuum gauge • 3 Channels MFC (LCD Touch Screen) • Water Chiller • Safety shell • SiH4 Detector • Silane and Argon (5% + 95%) mixture along with Regulator and Special Gas Cabinet for Silane with Leakage Detector (Qty.01) • Amonia Gas Cylinder with 2 stage regulator (Qty. 01) • Nitrogen Gas Cylinder with 2 stage Regulator (Qty.01) • All cylinders will be provided with proper fittings and tubing			
3	Cz-Crystalline silicon wafers	Specifications 1. 2-inch Solar Silicon wafer (Mono-crystalline) Dopant: P-type/Boron-doped Orientation: <100> Size: 50.8 x 50.8mm ±0.5mm Thickness: 180~200µm ±25µm Polishing: As-cut Resistivity: 1~5 ohm-cm Quantity: 70 2. 3-inch Solar Silicon wafer (Mono-crystalline) Dopant: P-type/Boron-doped Orientation: <100> Size: 76.2 x 76.2mm ±0.5mm Thickness: 180~200µm ±25µm Polishing: As-cut Resistivity: 1~5 ohm-cm Quantity: 65 3. 4-inch Solar Silicon wafer (Mono-crystalline) Dopant: P-type/Boron-doped	200 Wafers		

		Orientation: <100> Size: 100 x 100mm ±0.5mm Thickness: 180~200µm ±25µm Polishing: As-cut Resistivity: 1~5 ohm-cm Quantity: 65			
--	--	--	--	--	--

Please contact Dr. Sofia Akbar Tahir, Principal Investigator for any inquiry regarding the specification of Tender.

Details of Call Deposit Receipt (CDR)

Signature_____

No. _____ Amount _____ Name of Bidder_____

Bank _____ Branch _____ City _____ NIC No _____

Name of Firm & Address _____ Ph. No. _____

N.T.No. _____ Sales Tax No. _____

Issued By:

Dr. Sofia Akbar Tahir
Principal Investigator
Reference No. 006327/D/ISB/008/2021
Department of Physics
Government College University, Faisalabad
0301-6073960