

TECHNICAL BID PROFORMA

Item Name: High vacuum pulsed laser deposition chamber with Reflection High Energy Electron Diffraction (RHEED)

1.0 Bidder Eligibility Criteria:

I	Bidder Eligibility Criteria-I (Public Procurement – Preference to Make in India)	Class I / Class II	Local Content value	Reference, Page No.
I	Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16 th September 2020 and other subsequent orders issued therein.			
2.0	Bidder Eligibility Criteria-II	Compliance (Yes/No)	Reference Page No.	Remarks, If any
1	The bidder/OEM should have supplied at least 3 similar Items to IITs, NITs, IISERs, CSIR Labs or other Govt. R&D organizations in the last 3 years, PO copies or installation certificates along with contact details of end users need to be submitted as proof of supply. IIT Madras reserves its right to verify the claims.			
2	The bidder should provide local service engineer details to attend service related issues, within India			

3.0 Technical Compliance:

Minimum technical specifications required for one unit of High vacuum pulsed laser deposition chamber with Reflection High Energy Electron Diffraction (RHEED))
conditioner Specifications: -

S. No.	Specifications	Complied / Not Complied	Reference, Page No.
I	High pressure reflection high energy electron diffraction (RHEED) system		
1	High energy electron source: 35 keV or more electron source to be mounted on CFR63 with source power supply		
	a. 35 keV or more electron source to be mounted on CFR63		
	b. Source power supply, deflection power supply, 5 m cables		
	c. Double differential pumping option		
	d. Remote control		
	e. Magnetic shielding of the beam pass		
	f. Mechanical XY motion, mechanical tilt of the electron beam guide, electron beam finder, electronically controlled X and Y motion		
2	Gate valve CF35-38		

3	External magnetic shield for electron gun		
4	60-80 mm RHEED (fluorescent) screen with shutter mounted on CF100 chamber flange		
5	Beam current and gun controller (preferably through the computer control)		
6	High Speed camera:		
	a. To capture RHEED patterns onto a Data acquisition system. Atleast 15 Hz frame rate and 2048 X 2048 pixels, exposure time:0.025-60000 ms		
	b. Atleast 15 Hz frame rate		
	c. 2048 X2048 pixels		
	d. Exposure time 0.025 – 60000 ms		
7	Data Acquisition capabilities:		
	a. Sequential acquisition of diffraction images		
	b. Display real time contour plots, line profiles and surface plots on user defined regions in the diffraction pattern.		
	c. Simultaneously monitor an arbitrary number of lines yielding time resolved intensity (lattice parameter, coherence length) oscillations		
	d. Continuous display of real time summed image		
	e. Pre -installed PC with TFT monitor		
8	To be integrated with a standard 14 inch PLD chamber		
9	Spared: Filament, cathode unit and		
	a. Filament		
	b. Cathode unit		
	c. Spare fluorescent screen		
II.	Double differential pumping package compatible for RHEED system:		
	i). Turbo drag pump stage 67 l/s DN63CF - 2 numbers		
	ii). Flexible hose 2.75 inch O.D – 500 mm		
	iii). Compact CC gauge PKR 251		
	iv). Sensor cables, copper gaskets and other necessary accessories		
III	High Vacuum pulsed laser deposition chamber with load lock system:		
	High Vacuum Chamber		
1	a) 14-inch diameter or more chamber made of SS 304 materials and it should be electro-polished. The size of the chamber should be such that it can accommodate necessary view ports and all of the other essential modules mentioned in the specification.		
	b) The chamber should have the ports for the following modules. i) Multi-target carousel (CF 150) ii) Heater flange iii) Laser entry port iv) Load lock chamber v) RHEED and screen vi) Pressure gauges iv) Vacuum pump v) Viewing port with toughened glass windows and covers vi) Process gas inlet vii) Extra ports for any future upgrades with standard CF flanges.		
	c. The ports should have copper gaskets for leak proof chamber operation at high temperature.		
2	Multi-target carousel (Mounted on CF 150 flange):		
	a. Target stage capable of mounting 6 targets of 2.5 cm diameter each.		

	b. Stepper motor & Programmable controlled DC motor for selection of Target. The controller can index the targets as well as raster/rotate them in front of the laser beam.		
	c. The controller should be interfaced with the laser for multi-layer deposition		
	c. Necessary software should be provided if the target carousel need to be operated using computer.		
	d. Contamination shield should be provided for exposing only one target at a time.		
	e. All magnetic coupled movements, to be connected to Windows based personal computer (PC) for operation with software. PC should be included		
3	Load Lock: a. Load lock with magnetic transfer rod for 1 inch diameter sample and target exchange to and from the chamber.		
4	Substrate Holder and heater:		
	a. It should hold substrate of varying sizes from $0.3 \times 0.3 \text{ cm}^2$ to $2 \times 2 \text{ cm}^2$.		
	b. It should come with substrate rotation arrangement.		
	c. Substrate heater capable of heating the substrate atleast $800 \text{ }^\circ\text{C}$ in the operating oxygen atmosphere. Preferable mode of heating is by radiation or resistive heating.		
	d. The sample holder should have up and down movement by 25 mm.		
	e. It should have cooling mechanism for the heater electrodes. Appropriate water chiller should be provided.		
	f. The substrate heater with temperature monitor and programmable controller.		
	g. Capable of depositing the film in oxygen or Argon gas atmosphere		
	h. Magnetically coupled shutter should be provided for the heater.		
5	Optics:		
	a. Laser focusing and programmable laser beam raster capability for large area deposition.		
	b. SiO_2 disc-based intelligent window to prevents deposition on laser window.		
	c. Beam bending optics for bending the laser beam and delivering it on to the target should be provided		
6	Gas handling:		
	Digital mass flow controllers (200 SCCM max. flow) to control the gas inflow (Ar and O_2 gases). 0.6% of reading accuracy on most flow instruments. 4 ms response time. No warm up. Four process variables. Built in display.		
7	Vacuum System:		
	a. Pumping System:		
	i) For main chamber: Turbo Molecular Pump with a capacity of 600 liter/s or more along with dry pump.		
	ii) For load lock: small turbo pump (60 l/s) with a diaphragm pump		
	iii) It should be air cooled		
	iv) Vacuum chamber ports will be compatible with pump, fore pump and all other accessories.		
	b. Pressure Gauges:		

	<p>i). For main chamber: Pirani gauge and cold cathode gauge with the display capable of measuring 1×10^{-9} mbar</p> <p>ii). For load lock - CF40 flangewide range gauge</p> <p>iii). Pirani gauge along with the display to measure the pressure up to 1×10^{-3} mbar during the deposition.</p>		
8	Gate Valve:		
	a. Able to handle higher pressure differential between load lock and chamber.		
	b. Differential of at least 10^{-4} on the load lock and 10^{-8} in the chamber when the valve is closed		
9	Spares and accessories:		
	a. Laser entry CF viewport made of quartz (CF63) -2 nos, CF OFHC copper gaskets (1 set for chamber).		
	b. CF OFHC copper gaskets (1 extra set for chamber ports).		
10	Training and demonstration: training on usage of the machine (hardware and software) must be demonstrated by the successful bidder with no cost.		
11	Other requirements:		
	<p>a. Installation and Commissioning: After receipt of the item to IIT Madras, the complete system shall be integrated installed and integrated with UV excimer laser and RHEED gun assembly at the designated place by vendor's representative. The vendor's representative should also provide complete hands-on training to the purchaser after installation and commissioning</p>		
	b. Warranty: The Warranty on the complete system should be for Minimum 1 year and 1 year Extended warranty to be quoted.		

(Note: It is mandatory for the bidders to provide the compliance statement in tabular column format along with catalogue page number (comply/not comply) for the above points with document proof as required. Failing which bidders will be technically disqualified)

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