Technical Specification for Vacuum and electrical components to assemble a E beam evaporation and a co-sputtering system

Expression of interest is inviting, on behalf of The Director, IISER Mohali, in two bid systems for procuring and installation of Vacuum and electrical components to assemble a E beam and thermal evaporation system and a reactive Co-sputtering system. The bids are invited in 3 part system

(i) Technical specifications

(ii) Financial bid

(iii) Please provide an **Earnest Money deposit (EMD) of *Rs*. 2, 00,000** in favour of Registrar, IISER Mohali in the form of DD/Banker cheque/Bank guarantee.

All three parts must be sealed separately in labelled envelopes and sealed in a large envelope.

(UNIT I)

Vacuum and electrical components to assemble a E beam evaporation and thermal evaporation system:

1) SS- Cylindrical Chamber (height 2.5 feet and diameter 18-20") cut in D-shape with large door around 2 feet tall and 1feet wide to access all components . O-ring seals in bottom base-plate and top plate and a large door for easy access inside the chamber along with appropriate ports for gauges, gas, pumps etc. At least 6 CF-25 ports and 6 CF-40 ports for various feedthroughs across chamber and top plate. At least 6 1"base plate feedthroughs with blanks for future components.

Material should be electro-polished SS-316 or SS-304 or Aluminium.

2) Bottom base plate must have ears or should be larger diameter with holes (for 1/2 inch or larger support bolts) to mount chamber on frame or table. Top plate must also have a rim for easy removal

3) Chamber must have CF-160 or CF-100 pumping port on side depending on pump (dia will be given before placing order)

4) Appropriate ports for E-Beam gun on bottom flange

5) A LN_2 cold trap of the CF pumping port with a manual SS Gate valve must be provided.

6) CF-25 and CF40 extra ports 2 each on sides Two on top and 4 each on top plate future additions.

7) The door to have two shuttered view ports (with replaceable glass shield behind fixed glass shield). Door must have two or more knurled nuts to make a good vacuum seal. Position of door and viewports must give easy view to samples and evaporation sources.

8) Base plate mount current feed-throughs made of OFHC electrodes with teflon seals and push-fit based water cooling (for 6mm or 8mm od tube) . Must handle upto 200 Amps at upto 50 V. Feed through must be at least 6" long inside and outside the base plate. Must have bolts outside for lug connectors.

9) The inside the chamber of the feed-throughs must have an assembly with

a) Two electrodes

b) A OFHC plate sandwich assembly with fixtures to connect standard tungsten boats between The electrodes

10) A 6 MHZ Quartz thickness monitor (Inficon Q-pod or equivalent water cooled model). Must be placed below sample shutter via CF feed-through on cylinder body to monitor rates .

11) Rotary platen for glass slides about 8 to 10 slides of size 75 mm X 25 mm and or 3 inch wafers with clips. Drop down slots for the samples is preferred.(to be used without clips).

12) Two manual/mechanical shutters for covering the whole platen . Shutters must have parking position to expose whole platen area. This is to minimize the volume of chamber by having one large shutter.

13) sample platen heated up-to 150C.

14) Option for oblique sample holder should be given such that angular (30, 45 and 60 °) evaporation can be performed.

15) Shutter must be provided for the sources (both e-beam and thermal)

16) An electrode via a CF-40/25 port for generating an Ar plasma for sample cleaning along with the appropriate DC supply.(should be share with sputtering unit)

17) A swagelok needle valve via KF for titrating Ar

18) One variac and step down transformer providing ~ 200 amps and 50 v with current indicator.

19) E beam gun with power supply etc.

20) A water flow manifold must be fitted on to the system to distribute water from chiller to e-gun source , quartz monitor etc. with separate valves.

21) A metal stand with options to mount the chamber and small modules like turbo controller and pressure gauges. Stand must be of cleanroom compatible materials.

22) Additional BNC feedthrough on top flange via CF-25 port.

23) Two spare rotary shafts mounted on CF-25 feed-throughs.

24)

E-gun Specifications

Telemark make or equivalent 6KW nominal power or higher Electron Beam Source 6 Pocket, 7 cc, Bottom Drive or equivalent with appropriate 6KW power supply (Equivalent to Model TT-6 Electron Beam Power Supply from Telemark) along with sweep control including Analog Sweep with Oscillating Circle pattern, four pattern memory module, and handheld Joystick Remote. **Gun must be capable of doing materials like Tungsten, Nb , Pt etc at high rates > 3.0 A /S hence quote power of e-gun and source appropriately**

All feedthroughs for rotation, high voltages, water cooling, filament control etc to be provided.

High voltage grounding probe. Analog Sweep to Cheetah Digital Programmable Sweep (from Telemark) or equivalent

Frame to mount chamber etc and instrumentation rack appropriate for other electronics.

(UNIT II)Vacuum and electrical components to assemble a Reactive Co-sputtering system:

1) SS- Cylindrical Chamber 1.5 feet tall around 18" dia with CF -160 ports 3 for sample loading , heater assembly , one for two sputter guns with all the necessary feed throughs. 8 CF-40 ports for various feed throughs One BNC feedthrough , one rotatry shaft one for thickness monitor. Whole unit must be bakebale to around ~ 450 deg C . All CF -160 must be usable with viton O-rings as well as Copper gaskets. Rest have to be copper gaskets .

2) Chamber must have CF-160 or CF-100 pumping port on side depending on pump (size will be confirmed at time of ordering.

3) Manual Gate valve before a cold trap assembly.

4) LN2 cold trap after gate valve

5) Two Sputter guns mounted at 45 deg facing upward from one port on side or bottom.

6) Option for Glow discharge cleaning of samples.

7) Sample holder for 2" sample with heating upto around 1200 deg C for reactive sputtering

8) Shutters for covering sample space and to open after achieving desired rates.

9) Thickness monitor placed between sputter target and sample

10) Quote two multigas MFCs (Alicat or MKS) with standalone controller/reader with upto 20 SCCM and 1% accuracy of full scale. MFC must have swagelok 1.4" fitting must be progrrammable for process control with Ar, N2 , O2, H2 etc. Inlet for process gases must be placed appropriately for reactive sputteirng.

11) Also quote for needle valves for Ar and another process gas.

12) Glow discharge (Same DC supply must be used in Glow discharge for both e-gun system as well as DC sputtering.)

13) RF power supply 600 W (Advanced Energy Systems)

14) For DC power supply 1KV (ADL), Both power supplies must be capable of sputtering hard materials like Nb, Alumina, W and others.

Accessories:

1) Q-pod or equivalent thickness monitor reader compatible with the provided thickness monitors in both the systems.

2) One PC Intel-I5 windows 7 2GB ram with 3 yr warranty (Dell ,HP or equivalent)

3) 19" Instrumentation rack for all electronics like e-gun controller for Unit 1 .

4) A second 19" rack for 1 PC , Common instruments like DC supply for both units and RF supply for Unit II.

5) Mounting frames and stands for both systems (must be cleanroom compatible with powder coated metal and no wooden frames.)

6) 100 m of electro polished 1/4 " SS-316 tubing (Swagelok, Valex or Dockweiler)

7) Swagelok 1/4" unions 10 pieces with nuts , ferule sets 100 pcs swagelok 1/4" tube fittings 25 (brands must be Swagelok, valex Hamelt or equivalent.)

8)v Swagelok Tee 5 pieces

8) Tapping Point regulator(0-10 bar) 3 (swagelok, hamlet or spectron)

9) Regulators for N2, Ar , O2 gas cylinders(Spectron, Swagelok or Praxair)

10) Appropriate 6 numbers of alumina crucibles and 6 numbers of carbon crucibles

11) 20KVA UPS with overloading of 400% overrating for 10-20 mS (UPS must be from Messrs ESSAR Engineers Chandigarh or Power one) If 400% overrating is not available quote 30KVA UPS. Enclose UPS specs.

Consumables & Small accessories

1) KF-40 butterfly valve 2 nos

2) KF-25 bellows 1m 2 Nos

3) Bellow sealed valves KF 25 2 Nos

4) KF-16 bellow sealed valve 1 No

5) CF-160 copper gasket O-rings 20 nos

6) CF-160 viton O-rings 6 nos

7) Viton O-rings for unit 1 (base plates 2 , door) 3 nos each.

8) Heating tape upto ~ 450 deg for unit 2 with variacs

9) All nuts and bolts for CF 160 flanges. (including 3 sets of spares.)

10) Quartz crystals for thickness monitor ~30 pcs

11) one KF-25 to nozzle adapter (for 1/2 inch tube)

12) Evaporation boats 30 pcs

13) Quote for evaporation materials like gold and titanium

Warranty:

1) All items must be guaranteed after a leak test and have a one year warranty. Integration and demonstration of system capability using user provided pumps and gauges, water chiller etc.

Drawings:

Upon placing PO drawings in 3-D with free ware viewers must be provided in 2 weeks for approval. Else could result in cancellation of Purchase order if acceptable progress is not made in drawings for both systems.

If acceptable design is not reached in 4 weeks after first draft in two weeks could result in cancellation of full or part of purchase order if Indenter is not satisfied with progress.

Customer references:

Vendors must provide customer references for similar products. Bid may be rejected if appropriate references are not given.

Selection Criteria:

1)Vendor must give atleast 15 references for similar projects.

2)Feedback from customers will be used to qualify or reject vendors . (This includes the list provided by vendors as well as enquiry made by IISER to other Institutes like IITs , IISERs etc)

3) Vendors who have failed to supply in past for similar products in IISER will be summarily disqualified.

4) We reserve right to ask for a presentation/discussion on the product if the documents or vendor capabilities are not clear. (tentatively within 1 week to 2 weeks of final bid date)

5) Vendors complaining about other competitors without documentary evidences (like blacklisting by Govt Institutes) will not be encouraged and even disqualified.

6) The specifications in this expression of interest are a guideline . Depending on end user needs technical committee will accept or reject small changes.

7) Technical Drawings from 5 pervious projects showing vendors capability to handle complex

Projects must be supplied.