INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

PR No. 1000035495 **RFx No. 6100001885**

Technical Specification of Atomic Layer Deposition System

Technical Specifications		Compliance (Yes/No)	Additional Information (If any)
Item 1	**Atomic Layer Deposition system (Qty -1)**		
1	Technical Specifications: -		
1.a.	Heated chamber isolation valve for high exposure, high conformality processes		
1.b.	Dedicated process kit with optimized precursor flow path and all metal sealing upstream of sample		
1.c.	Precursor input: 1 process gas & 1 high vapor pressure liquid oxidant (H_2O or H_2O_2)		
1.d.	3 solid or liquid metal sources		
1.e.	All sources include heated, integrated dose volumes for precise and quantifiable precursor delivery		
1.f.	4 Swagelok or substantially equivalent thermal ALD valves		
1.g.	5 high temperature dose volume fill valves		
1.h.	Fujikin or substantially equivalent metal sealed, 200 sccm MFC for N_2 or Ar purge flow control		
1.i.	Fully automated temperature control system for bottles, dose volumes, precursor delivery manifold and chamber		
1.j.	Chamber heater control based on dual temperature probes for accuracy and as probe failure failsafe		
1.k.	Color touchscreen control and PLC operation		
1.l.	Software embedded in PLC with integrated process recipes		
1.m.	36-month complete process development support and lifetime process development assistance.		
2	Separate Precursor Lines		

2.a.	All organometallic sources must 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.b.	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.		
2.c.	All Source Lines must be electropolished stainless steel tubes with metal sealed VCR fittings		
3	Software and Electronics		
.3.a.	Human Machine Interface (HMI) PLC system with touch screen panel		
3.b.	Advanced controls suitable for the deposition of standard ALD cycles as well as e.g. Nanolaminates, Doped Thin Films and Ternary Thin Films.		
3.c.	Recipe database for high quality, tested processes		
3.d.	Custom recipe input screen		
3.e.	Real time display of process status		
3.f.	Individually programmable heated source temperatures		
3.g	Built-in pulsing sequences for ternary compounds and nano-laminates		
4	Safety		
4.a.	Vacuum switch and separate capacitance manometer pressure measurement to ensure system is under vacuum during processing		
4.b.	Hardware interlock for overheating		
4.c.	Bottle overheat software interlocks		
4.d.	Physical emergency off (EMO) button on front panel		
4.e.	Normally closed pneumatic valves (all valves will be closed in the event of a system failure or EMO).		
4.f.	All exterior surfaces are touch safe		
5	Mandatory Requirements		
5.a.	Vendor to have multiple systems operating in internationally renowned institutes or universities,.e.g. Harvard University Centre for Nanoscale Systems, University of Cambridge Cavendish Laboratory etc.		
6	Other Requirements		
6.a.	Process qualification		
6.a.i	Over the entire wafer deposition of pinhole free 2nm Al_2O_3 for GaN/SiC wafers. surface roughness should be less than 0.2 nm or the substrate roughness whichever is larger. The process will be repeated 3 times for a 4-inch substrate. This should be RMS roughness determined over 50 um x 50 um area via AFM.		
6.b.	Installation needed, with Operational and installation manual		
6.c.	Needed Tool Kit for ALD system		

6.d.	Warranty: Standard 1-year manufacturer’s warranty required		
Item 2	**Precursor Bottles (Qty -1)**		
	a. 50cc SS bottle with bellows sealed high temperature compatible valve b. 50cc SS bottle for H20 with valve		
Item 3	**Pump Oil (Qty -1)**		
	a. Fomblin or substantially equivalent Pumping Fluid 2 kg		
Item 4	**Heating Jacket (Qty -1)**		
	a. One Conformal Heating Jacket with secondary elbow heater for operation to 150DegC		
Item 5	**Vacuum Pump (Qty -1)**		
a.	Mechanical Direct Drive Pump for PFPE oil		
	17 CFM (pumping speed) 50Hz		
	2 Stage, Single Phase		
	0.75 HP, 37 kg		
	Fomblin or substantially equivalent included		
OR			
b.	Direct Drive Rotary Vane Vacuum Pump for PFPE oil		
	18.3 CFM (pumping speed) 50Hz		
	0.7 HP, 37 kg		
	Fomblin or substantially equivalent included		
Item 6	**POSI-TRAP with NW-40 ports (Qty -1)**		
	a. Activated charcoal filter installed for precursor abatement b. 3ft NW25 SS bellows hose to connect vac inlet to ALD system		