



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076.

Ref. PR No. 1000055425

RFx. No. 6100003003

Technical Specification: Sputter Deposition Setup (Qty – 1 Nos)

Sr No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
	<u>Sputter Deposition Setup</u>			
1.	Cylindrical or Spherical vacuum chamber with following components:	<p>a. Dedicated ports for viewing, pirani and penning gauges, gate valve, process gas inlet, substrate holder flange, two sputtering sources, ports for Langmuir probe and optical emission spectroscopy study during sputter deposition processes.</p> <p>b. Sputter source ports aligned in such a way that the simultaneous deposition from the two targets is in a 'confocal' geometry on the substrate heater.</p> <p>c. Pirani gauge with range from 1×10^{-3} mbar to 1 bar.</p> <p>d. Cold cathode gauge with range from 1×10^{-8} mbar to 1×10^{-2} mbar.</p> <p>e. Manual gate valve with adjustable opening.</p> <p>f. Appropriate mass flow controllers having a capacity from 0 – 100 sccm for simultaneous flow control of up to two process gases with appropriate valves to control each of the process gases should be added. The two process gases can be mixed</p>		

		before sending into the deposition chamber. Process gases envisioned are N ₂ , Ar, and O ₂ .		
		g. Substrate heater of designed with capability of sustained operation at 800 C for up to 4 hrs. The substrate heater to be calibrated for temperature on a Si substrate of 2" dia.		
		h. The substrate heater capable to sustain uniform temperature within +/- 5 C of set temperature value over an area of diameter 2".		
		i. Substrate heater with continuous rotation facility for ensuring uniformity of film thickness profile.		
		j. The substrate heater and sputter source combination with the ability to change the target substrate distance within the range of 3.5 cm to 10 cm. (substrate heater with sample holder with bellow sealed insitu movement of 25mm is provided).		
		k. The substrate heater comes with a manual shutter to close off the plasma from the substrate.		
		l. Possibility to 'bias' the substrate heater by an appropriate DC power supply having the capability to provide up to 100 V. This will be enabled in the heater used for confocal deposition. Appropriate DC power supply is included.		
2		Chamber mounted on appropriate table-mounted frame, which can incorporate the controls and displays for the vacuum gauges, gas valves, substrate heater temperature PID and MFC.		
3.		There will be total two sputter sources and sputter target backing plates for 2" diameter targets. 2nos RF power supplies of capacity 300 W each and		

		auto-matching networks.		
4.		Appropriate chiller for cooling the sputtering targets is included.		
5.		Load-lock and sample transfer mechanism to move sample between the deposition and load-lock chambers.		
6.		Appropriate turbo-molecular pump (at least 250lit/sec) and dry backing pump (10 m3/hr) included such that starting from atmospheric pressure, the chamber can be evacuated to 1×10^{-6} mbar within 2-3 hours of pumping.		
7.		Langmuir probe to measure the plasma potential is provided.		
8.		Port to attach an optical emission spectroscopy attachment to monitor the plasma is provided.		
9.		The substrate heater provided should be facing the ground (downward-facing) when mounted inside the chamber, so that the configuration is 'sputter-up' when the film is deposited.		
10.	Other Requirements:	Pre-dispatch inspection: Online/Offline Pre-dispatch inspection before dispatch should be facilitated and all functionality, including base vacuum, deposition etc. will have to be demonstrated to the satisfaction of user.		
		A list of users in centrally funded technical institutions (CFTIs) for sputtering systems should be submitted together with a report of satisfactory performance from at least two end users.		
		3 Proofs of supplying 800C heaters with required uniformity for 2" substrate, continuous rotation, insitu bellow sealed updown movement of heater an sample holder and biasing capability should be provided with letter of confirmation about the same from end user who should be from centrally funded institute.		
11	Warranty:	Warranty of 1 year from the date of installation.		