Office of the Dean Research and Development
Indian Institute of Engineering Science & Technology (IIEST), Shibpur
Howrah-711 103

Project Code: DRC/DST/CEGESS/HS/043/10-11

Centre of Excellence for Green Energy & Sensor Systems
Indian Institute of Engineering Science & Technology (IIEST), Shibpur
Howrah-711 103

Notice Inviting Quotations

Sealed quotations are invited for the supply of
Item 1. Chemicals. Item 2. TMAH . Item 3. Al doped ZnO sputtering target. Item 4. ITO target Item : 5 Xenon Arc Lamp, Item 6: MFC repair and calibration . Item 7: *Sensors. Item 8: Miscellaneous stationaries , 9. Repairing of coating unit*
10. Vacuum feting , 11. Deposition Boats, 12.* Pirani Gauge *13. Objective for SCIL , 14. Chrome target

as per the following technical specification. The technical specification can be downloaded from the website. The document can be also obtained from the Centre of Excellence for Green Energy & Sensor Systems (contact: Prof. H. Saha) between 10.30 a.m. and 3.00 p.m. on all working days. The invitation is valid for Seven working days from the date of publication of this notice.

Dean (R & D)

(A. Code DRC-T034/17-18)

SECTION I: <u>TERMS & CONDITIONS</u>

1. The last date of receipt of quotation is valid **for 7 working days** from the date of publication of this notice**.** Quotations received later will not be entertained under any circumstances.

2. Potential supplier are to submit the quotations in Sealed Cover to the Centre of Excellence for Green Energy & Sensor Systems in the following address:

Prof. Hiranmay Saha
Chair Professor & Project Investigator
CEGESS
IIEST, Shibpur
Howrah-711103, India

3. **Item name must be mentioned on cover**

4. The price quoted should be inclusive of all Taxes in INR, duties and levies. Inclusion of Tax/Levy at a latter stage will not be accepted. Freight, Insurance charges should be clearly indicated.
5. Vendor have proven track record of supply in IIEST, IIT, NIT.
6. All commercial document (Trade License/ vat/CST/PAN/TAN) should be attached. (photo copy duly signature)

SECTION II: TECHNICAL SPECIFICATIONS

Item list : Chemicals

Sl. No.	Name of the Chemical	Amount Required
1	Sodium Nitrate ($NaNO_3$)	200 g
2	Copper(II) nitrate trihydrate [$Cu(NO_3)_2 \cdot 3H_2O$]	200 g
3	Copper Sulphate, pentahydrate	500 g
4	Mohr's Salt	500 g
5	Potassium antimonyl tartrate trihydrate	250 g
6	Potassium Chloride(KCl)	500 g
7	Sodium thiosulphate	500 g × 2
8	HMT	500 g
9	Thioacetamide	500 g
10	PVDF	100 g
11	PEDOT:PSS, Poly(2,3-dihydrothieno-1,4-dioxin)-poly(styrenesulfonate)	250 g
12	Ammonia (l)	500 ml
13	Hydrogen peroxide	500 g ×2
14	Acetonitrile	1 Lt (local)
15	Acetone	1 Lt
16	Methanol	3 Lt
17	Dimethylformamide (DMF)	500 ml
18	Rose Bengal	25 g
19	Methylene Blue	25 g
20	Rhodamine B	100 g
21	Methyl Orange	100 g
22	Teflon coated Hydrothermal unit with Autoclave (Local) 25 ml	1
23	Hydrazine monohydrate N2H4 64-65 %, reagent grade, 98%	500 gm

Item :2 TMAH

9 X 1 Ltr Tetramethyl Ammonium Hydroxide (TMAH) Solution, ACS Reagent Grade.

Item : 3 Target

Al doped ZnO sputtering target

Specification:
ZnO/Al_2O_3(98%: 2wt %)
Size**: 4" Dia x 1⁄4" Thickness**
Purity: 99.99%
Backing plate: OHFC 3mm thick backing plate bonded with silver epoxy
Size of the backing plate: **Dia 4" x 3mm Thickness**.

Item :4 ITO sputtering target

Specification:
ITO (In_2O_3:SnO_2= 90:10 wt%)
Size:4" Dia x 1⁄4" Thickness
Purity: 99.99%
Backing plate: **OHFC 3mm** thick backing plate bonded with silver epoxy
Size of the backing plate: **Dia 4" x 3mm Thickness**.

Item : 5 **Xenon Arc Lamp 300W 9 (Quantity: 1)**

Specifications		
Description	**Nominal**	**Range**
Power	300 Watts	180-320 Watts
Current	21 amps (DC)	10-22 amps (DC)
Operating Voltage	14 volts (DC)	13-16 volts (DC)
Ignition Voltage	23-35 kilovolts (system dependent)	
Temperature	150º C (Maximum)	
Radiant Output (Watts)	65.0	
UV Output (Watts)	8.5	
IR Output, >770nm (Watts)	30	
Visible Output, 390-770nm (Lumens)	5850	
Color Temperature (Kelvin)	5900	
Output wavelength	235 - 1050nm	
Spot Size at Crossover(inches / mm) @ 50% points	.09 / 2.3	
Spot Size at Crossover(inches / mm)@ 10% points	0.23 / 5.8	
f-Number	1.0	
Focal Distance “A” (inches / mm)	.550 / 13.97	
Cathode Defocus “D” (inches / mm)	.008 / .20	
Arc Gap (inches / mm)	.038 / .97	
Window Diameter (inches / mm)	1.00 / 25.4	
Focused Output(Lumens / Watts)6mm Aperture	1250 / 11	
Focused Output (Lumens / Watts)3mm Aperture	650 / 6.4	
Lifetime*	1000 hours typical	

Item : 6 **Calibration work require for the listed BRONKHORST MFC.**
Device Part number are as follows

1. **F-201CB-200-ABD-00-V**
2. **F-201CB-500-ABD-00-K**
3. **F-201CB-500-ABD-00-V**
4. **F-201DV-MAD-22-Z**
5. **F-201DV-MAD-22-E**
6. **F-201DV-MAD-22-K**

Price must be included all the taxes and transport charges
Warranty period expected 6-8 months.

Item : 7

Technical Specification for Oxygen Sensors:

1. Detection Range O_2 : 0-100%
2. Accuracy ± 1%
3. Operating Temperature : 10-50°C
4. Type of sensor: electrolyte based sensor. Also required to have a Built-in temperature compensation circuit facility
5. Low cross sensitivity towards other reducing gases like H_2S, CO_2, SO_2, H_2, CO, NOx
6. Quantity: 2 nos

Technical Specification for Ammonia Sensors

1. Typical detection range 40 ~ 250 ppm
2. Type: Metal oxide sensor
3. Low operating voltage: 5V DC/AC
4. Very Low power consumption < 25mW
5. Heater Power consumption not more than 850 mW
6. Quantity: 2 nos

Technical Specification for Methane Sensors

1. Low power consumption < 350mW
2. Sensing principle MOS type
3. Selectivity towards methane gas.
4. Detection range : 500-10,000 ppm
5. Low operating voltage 5V DC/AC
6. Quantity: 5 nos

Technical Specification for Carbon Monoxide Sensors

1. Electrochemical type sensor.
2. Typical detection range 0~ 10,000 ppm
3. Wide Operating temperature: 10˚C - 50˚C (continuous)
4. Selectivity towards CO
5. Required to operate in the humidity range 10-95% RH
6. Quantity: 5 nos

Item: 8

Sl. No.	Items	Qty. (Nos.)
01.	Aluminium wire (Purity-99.995%)	10 meter
02.	Plastic Box 2"x2"	24
03.	Tissue	24
04.	Diamond Cutter	2
05.	Aluminium Sheet (2mm Thickness) 1 meter x 1 meter	1
06.	Plastic twisher	24
07.	5 Nos. Metal twisher	16
08.	Scotch Bite	48
09.	Screw Driver Set	1
10.	Range Set	1
11.	Borosil Beaker (500ml)	6
12.	Whatman Filter Paper 90 mm Dia (no.1)	4
13.	Whatman Filter Paper 110 mm Dia (no.1)	4
14.	High Pressure Plastic Pipe 4 mm x 6 mm Dia (ID)	20 meter
15.	High Pressure Plastic Pipe 8 mm x 6 mm Dia (ID)	15 meter
16.	High Pressure Plastic Pipe 12 mm x 8 mm Dia (ID)	10 meter
17.	High Pressure Plastic Pipe 10 mm x 8 mm Dia (ID)	10 meter
18.	Pipe Cutter	2

Item: 9

Servicing & Repairing

1. Coating unit (existing)
   Servicing of the instrument along with diffusion pump.
2. Sputtering Machine (existing) including MFC,RF generator etc.

Item: 10

Item with description	Quantity
Seamless Tubing 1/4" OD x 0.035" wall thickness, 6 mtrs. length,	18.00
SS Ferrule Set - 1/4" OD Front + Back Ferrule	20.00
SS VCR Face Seal Tube Fitting Connector Body, 1/4" Male VCR x 1/4" OD	6.00
SS Welded TubeFitting Connector - ¼ WVCR x ¼ OD	6.00
SS Union Elbow - 1/4" OD	6.00
Tube Fitting, Union Tee, SS316,1/4" OD end connection	6.00
SS Union - 1/4" OD	6.00

Item : 11

1. Molybdenum Boat (200 AMPS) 10 NOS
2. Tungsten Basket for Thermal Evaporation (200 Amps) - 24 No.

Item: 12

Active Pirani Gauge (APGX-L-NW16/ALI) – 2 Nos.

Item : 13

Offset objective for SCIL MA/BA 6 lithography unit

Focal Length = 25mm
Magnification at reference Focal Length= 7.2X
Offset = 10 mm
Minimum Objective Distance = 12 mm
Working Distance in air = 19.6 mm
Field of View at DVM Microscope = 0.88 mm x 0.67 mm
Quantity = 2 nos

Item : 14

Chrome target for sputtering:

Thickness: 3 mm
Diameter: 2"
Purity: 99.999%
Backing Plate: Oxygen free Cu (2 mm thickness)

Platinum target for sputtering:

Thickness: 2 mm
Diameter: 2"
Purity: 99.999%
Backing Plate: Oxygen free Cu (2 mm thickness)

Crucibles for E-beam evaporation

Graphite Crucible: volume: 4CC, Quantity: 4 nos
Alumina (Al2O3) crucible: volume: 4CC, Quantity: 4 nos
Boron nitride crucible: volume: 4CC, Quantity: 4 nos

Item : 15

Assorted Vacuum components

Butterfly Valve: Diameter:1" and 2" (Quantity: 2 no each)

Langmuir Probe for Plasma Diagnostic for PECVD deposition

Vacuum Gauge Heads (2 each)

for low vacuum (Upto 10E-3 Torr)
for High Vacuum (10E-4 to 10E-8 Torr)

Mass flow controller with read out
Gas: N2
Flow rate : 0-100 sccm
Quantity: 2 nos

Item : 16 (Chemicals For plasmonic Nanoparticles)

Chemical	Company	Amount	Quantity
Ethanol(CH_3CH_2OH)	Merck Germany	500 ml	2
TEOS (Tetraethyl orthosilicate, $SiC_8H_{20}O_4$)	Merck Germany	250 ml	1
Hydrazine hydrate (N_2H_4, 50-60%)	Sigma-Aldrich	250 ml	2
Chloroauric acid ($HAuCl_4.xH_2O$)	Sigma-Aldrich	500 mg	1
Pentanol($C_5H_{12}O$)	Sigma-Aldrich	500 ml	1
Cyclohexane(C_6H_{12})	Sigma-Aldrich	500 ml	1
CTAB(Cetrimonium bromide $[(C_{16}H_{33})N(CH_3)_3]Br$)	Sigma-Aldrich	500g	1