

CORRIGENDUM

Tender reference no.: e-Proc/ETC_20122018/ LAB_EQUIP_IEST/273

Tender Id: 2018_IEST_421773_1

Name of the Work: Supply of Laboratory Equipments, Computers Printers, Software

Kindly Note(i):

The following specs are to be considered as final for the above mentioned tender in Item no. 05

Item 05

“BET SURFACE AREA and “PORE SIZE ANALYSER with CHEMISORPTION Facility” with reference to the

Characterization of surface properties of THIN FILM samples such as BET Surface area, pore size distribution, pore volume by Physisorption method and TPD/TPR/TPO by chemisorption method.

PHYSISORPTION

The instrument should have facility to perform automatic gas sorption analysis using static volumetric method.

System should have minimum following technical specifications;

- The sample for which the Physisorption and Chemisorption is to be measured;
- 1. **Thin Film:** (Thickness: 10 nm to 1 μm) of semiconducting oxide like ZnO, TiO₂, SnO₂, MnO₂ etc. deposited on conducting (Metal) and insulating substrate (glass, Si, SiO₂). Thin film of graphene and graphene oxide, and reduced graphene oxide, deposited on above mentioned substrate.
- 2. **Bulk Material:** Si, SiO₂, Metals
- **Surface Area Range:** At least 0.01 m²/g (in nitrogen)
At least 0.0005 m²/g (in krypton)
- **Pore Size Range:** At least 0.4nm to 500 nm
- **Repeatability:** less than $\pm 1\%$
- **Analysis ports:** At least TWO
- **Volume of dewar:** ≥ 3 liter ; > 72 hours
- **Available adsorptive (mandatory) :** N₂, O₂, Ar, Kr, CO₂, H₂ or any other non-corrosive gas.
- **Other Desirable Adsorptive (But not Mandatory):** Volatile Organic Compounds like alcohol vapours
- **P/Po range:** At least $10^{-7} - 0.995$
- **Degas Port :** External/internal degasser with degassing port with vacuum pump (preferably turbo-molecular)
- **Temperature Range :** From room temperature to 450°C or higher
- **Pressure Transducer Accuracy:** $< \pm 0.15\%$ of reading
- **Ultimate Vacuum:** System should achieve 1×10^{-7} by turbo-molecular drag pump, connected in series with an oil-free diaphragm pump.

- Data acquisition System: System should have high-precision A/D conversion system, with the data storage functions
- System should have Suitable facility for coolant level control.
- System should have data export facility in real time during testing for comparison analysis between data and reference model
- It should have built in Mass flow controllers
- **ANALYSIS CAPABILITIES:**
 - Isotherms: more than 100 data points (per station)
 - Surface Area: BET, Langmuir, t-plot, BJH, DR
 - Mesopores: BJH
 - Micropores: t-plot, MP, DR, HK & SF methods.
 - Other: Average pore size, Total pore volume and if any other.

CHEMISORPTION

The fully automated high pressure, computer, controlled system for temperature programmed studies like Temperature Programmed Desorption, Temperature Programmed Reduction, Temperature Programmed Oxidation with following specification;

- The equipment should provide with high sensitivity Thermal Conductivity Detector (TCD) to detect corrosive/ active gases like N₂, O₂, H₂, CO, CO₂, NH₃ and mixture gases. Carrier gases He, Ar and other inert gases.
- System should have Programmable furnace with temperature range ambient to 1000°C with high temperature accuracy. The furnace should have built in fan for cooling/suitable other device for rapid cooling.
- It should have built in Mass flow controller with flow upto 100cm³/min.
- System should be supply with required accessories including PC, Printer, Gas cylinders with two stage gas regulators of N₂, CO₂, Helium, H₂, Mixture of gases for TPD/TPR/TPO, Suitable UPS with 30 min back-up, Minimum 26 Liter Liquid Nitrogen container etc.
- Supplier/Manufacturer should have service support in India/Kolkata region.
- Instrument should be under warranty for 24 Months from date of Installation

Kindly Note(ii):

The following Specs are to be considered as final for the above mentioned tender in Item no. 09

09	<p style="text-align: center;"><u>Portable/Hand Held RF analyzer covering frequency range (100MHz-40 GHz)</u></p> <p>Specification:</p> <ul style="list-style-type: none"> • Frequency range : 100 MHz to 40 GHz or better • Frequency resolution: 1.5 Hz or better • Number of Ports: Full 2 Port (S11, S21, S12, S22) 	One Set
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	<ul style="list-style-type: none">• Dynamic Range: 110 dB (typ.)for full Frequency range.(or better)• Output power: High: + 5 dB, Low : -20 dB (Or better)• Sweep/Measurement Speed: 400 micro-second• Calibration Kit: Mandatory• Test Cable: At least 2 Nos.• Display: In build / External Graph/Display Format: Log Magnitude, Phase, Linear Magnitude, Real, Imaginary, SWR, Impedance, Smith Chart, Polar.• Service: Manufacturer / Supplier must have service Center in India. Please mention detail address of Service center.	
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