Tender Specifications for Surface Area and Pore Size Analyser with chemisorption and TPD/TPR/TPO

Required Integrated Three-In-One Catalyst Characterization System for:

1. **Vacuum Volumetric Physisorption measurements**
2. **Vacuum Volumetric Chemisorption measurements.**
3. **Flow Chemisorption (Pulse Titration) and TPD/R/O measurements.**

Vacuum Volumetric Physisorption measurements

- Oil free vacuum system for both analysis and degassing.
- One Analysis station with dedicated 1000 Torr, 10 Torr & 0.1 Torr transducer for measuring equilibrium pressures on sample station in the range of 10^-8 to 0.999 relative pressures, using Nitrogen gas as adsorbate,at Liquid Nitrogen temperature.
- Saturation vapor pressure station with dedicated 1000 Torr transducer to measure the saturation vapor pressure simultaneously.
- RTD sensor to detect coolant level with appropriate feedback electronics to an automatic dewar elevator to maintain the coolant level within +/- 0.5 mm.
- Two degas stations with dedicated
  - Liquid Nitrogen Cold Trap to trap gasses and vapors evolved from sample during degassing
  - Pirani Gauge to monitor ultimate vacuum
  - 1000 Torr transducer for monitoring back fill gas pressure. and programming back fill gas pressure.
  - Multiple step temperature programming for both the degas stations.
  - Also,the degas stations should be equipped with
    - Heating mantles to permit a maximum degas temperature of 300 degree C
    - An ultimate oil free degas vacuum of 3.75 x 10^-10 to ensure degassing of samples which cannot be heated to temperatures greater than 75 degree C during degassing.

Vacuum Volumetric Chemisorption measurements.

- The system must be equipped with a multiple gas input manifold with automatic selection of a desired gas through software.
- The system must be equipped with a 1100 degree furnace with PID control for constant rate and stepped temperature programming.
- The system must provide automated multiple analysis on the same sample (through different user programmed treatments) in batch mode.
- Combined and Weak chemisorption isotherms must be measured automatically.

TCD based TPR/TPO/TPD and Pulse titration Analysis

- The TCD block must be integrated into the main unit as mentioned above.
- The filament of the TCD must be made of Tungsten/Rhenium and resistant to Air/Oxygen, Ammonia and Amines.
- The TCD block must be air-cooled.
- Pulse Titration by syringe or optional injection loop.
- The software must have provision to calculate area under pulse titration/TPD/R/O peak.

- System should have at site upgrade for second Physisorption analysis station with dedicated 1000 Torr, 10 Torr & 0.1Torr transducer for measuring equilibrium pressures on this sample station in the range of 10^-8 to 0.999 relative pressures, using Nitrogen gas as adsorbate,at Liquid Nitrogen temperature.

- **ACCESSORIES REQUIRED FOR THE INSTRUMENTS OPRATION**

1. **GAS:** All gas tanks must be 99.999% Ultra High Purity. Minimum: One (1) tank each of Helium and Nitrogen; One tank of Hydrogen (for Chemisorption) other gases for specialized applications (e.g. Argon for Zeolite characterization; CO2 for activated carbon characterization)
2. **GAS REGULATORS:** Non-venting two stage, stainless steel diaphragm regulators for Helium,Nitrogen, Hydtrogen,Argon and CO2, with adequate resolution for 10 psig. 1/8" (inch) swage fitting is required on the end of the regulator.
3. **LIQUID NITROGEN:** 50 liters Liquid Nitrogen Container.
4. **UPS: 5 KVA UPS with 30 Minute backup.**
5. **COMPUTER:** Minimum requirements are as follows:
   Pentium-based PC, 1.8 GHz Processor
   Operating System: Windows XP or Windows 7
   RAM: Minimum requirement of Operating System
   Hard Drive: 1 GB hard disk free space available
   Required Other: CD Drive, Ethernet Port.
6. **Printer :** Laser Jet Printer

Please submit the techno-commercial quotations separately in sealed envelopes to the undersigned before March 23, 2013.

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