

INDIAN INSTITUTE OF TECHNOLOGY KANPUR
DEPARTMENT OF CHEMICAL ENGINEERING
DATED: 05/01/2014

Enquiry No.: IITK/CHE-CARE/NV/01

Deadline: 5 PM, 2nd January 2015 (Extended)

Sealed quotations (separate technical bid and price bid) along with proprietary certificate and authorization letter/ certificate are invited as per the specifications given below for the following items from authorized suppliers:

Name of Equipment: UV VIS NIR SPECTROPHOTOMETER (UNIVERSAL MEASUREMENT SPECTROPHOTOMETER) & FLUORESCENCE SPECTROPHOTOMETER

DRAFT TECHNICAL SPECIFICATION:

UV VIS NIR SPECTROPHOTOMETER (UNIVERSAL MEASUREMENT SYSTEM)

- 1) Advance Double out-of-plane Littrow monochromator
- 2) Spectrophotometer wavelength Range : 175–3300 nm or better
- 3) Wavelength reproducibility (nm) SD,10 measurement -UV VIS : <0.005 nm ,NIR : <0.02 nm
- 4) Photometric range (Abs) : 10 Abs or better
- 5) Resolution: UV VIS : <0.049 nm & NIR : <0.2 nm
- 6) Spectral bandwidth (nm) : UV-Vis : 0.01–5.00 nm with 0.01 nm steps & NIR : 0.04–19 nm
- 7) Stray light (%T) :-At 220 nm (10 g/L NaI ASTM method) : <0.00007%
- 8) Grating -UV VIS -RLDG 1200 lines/mm blazed at 250 nm, NIR: RLDG 300 lines/mm blazed at 1192 nm.
- 9) Four detectors consisting of a high performance photomultiplier tube (PMT), proprietary PbS detector and a two-colored Si/InGaAs detector.
- 10) Ability to move the detector and the sample, independently of each other, providing a true multi-modal measurement system capable of absolute reflectance, transmission and scattering without moving the sample.
- 1) Photometric reproducibility (Abs) - NIST 930D filters : <0.00008 (SD 10 measurement)
- 2) Photometric accuracy (Abs) - <0.00025 Abs (DA methods @ 0.3 Abs)
- 3) Photometric linearity - UV-Vis, at 1 Abs: <0.0007 Abs
- 4) Photometric noise (Abs/RMS) @ 0 Abs - UV <0.00009 ;UV VIS <0.00003;NIR <0.00004
- 5) Repetitive scanning - Maximum number of cycles 999 & Maximum cycle time (min) :9999
- 6) Baseline flatness (Abs) : ± 0.0007 (200 to 3000 nm)
- 7) Signal averaging - 0.033–999 s
- 8) Data interval nm - UV VIS 0.005–1.111 nm & NIR 0.02–4.444 nm
- 9) Maximum scan rate - UV-Vis :2000 nm/min & NIR :8000 nm/min
- 10) Purging option for sample and optical compartment
- 11) Slew rate - UV-Vis :16000 nm/min & NIR : 64000 nm/min
- 12) 10 mm UV VIS and NIR cuvettes with 3ml samples.
- 13) Diffuse Reflectance Accessory (DRA) 110mm with power holder : 110mm or more

14) 10 mm UV VIS & NIR cuvettes (01 Set each)

15) Accessories with Automated & software controlled operations & below measurement mode & features must be available. :

- Direct transmission and variable angle transmission from 0 to 180 degrees in 0.02 degree Intervals.
- Must provide for automated, unattended, measurement of absolute reflection and transmission, at user definable angles, for s-polarized and p-polarized light.
- Must be capable of measuring absolute reflection and transmission from exactly the same point on the sample without moving or disturbing it or the light incident upon it.
- Diffuse scattering, reflection or transmission through independent sample rotation (360 degrees) and detector positioning (10 – 350 degrees) at 0.02 degree intervals
- Sample Size :Diameter 5 mm –275 mm & physical thickness: 30mm
- Absorptance, A where $A = 1 - R - T$ at variable angle without moving the sample or beam onto the sample for improved productivity and greater accuracy
- Reflection/Transmission at single wavelength (read) or wavelength range (scan)
- Absolute reflectance, transmission. wavelength Range :190 – 2800 nm & AP wavelength range : 250 – 2500 nm and scattering without moving the sample
- Aperture Masks : Incident beam: 1, 2 and 3 degrees s& Detector: 1, 1.8, 2, 3, 4, 4.4, 5 and 6 degrees
- Upgradation must be possible in future with multi-sample holder/Autosampler with capacity to mount up to 32 x 1 inch diameter samples
- Software: Windows Xp or 7 based user friendly software. Ordinate Modes: Abs, %T, %R, Absolute %R, Log Abs, 1st-4th Derivative, Absorptivity, and Dual Ordinate mode, Kubelka-Munk functions, Abscissa Modes ,Continuous, stepped and multi-point modes: nm, cm^{-1} , Å , min/sec, mm, angle
- Baseline Correction unlimited baseline scans can be stored. Modes include: Multicell, Multi-angle, 0% and 100% corrections, Standard reference correction, Kinetics.
- Data Collection Modes; Continuous scanning. stepped scanning, Signal to noise mode scanning and Independent NIR control scanning

Fluorescence spectrophotometer:

- A. The instrument must be capable of multiple data collection modes including fluorescence, phosphorescence, chemi-luminescence and bio-luminescence.
- B. System should have variable wavelength. 1.5 nm to 20 nm or better
- C. Detector Spectral Range (both excitation and emission): 190 to 900
- D. Scan speed: 22500 nm /min or better.
- E. Detector: Two red sensitive PMT detectors (R-928 or better) for both excitation and emission.
- F. Kinetic Mode: Kinetic mode and 3 D plotting should be available with option to collect continuously for minimum 7 Days.
- G. The instrument must be a Xenon flash lamp based instrument that has room light immunity for fluorescence mode allowing samples or accessories to be measured without closing the sample compartment lid. The Xe flash lamp will also minimize fluorescence photo-bleaching of any samples and must also flash at 80 Hz to allow fast data collection.
- H. The instrument beam must have horizontal excitation beam geometry for maximum collection efficiency and to permit the use of low sample volumes in cuvettes (500 ul using normal 10 mm path length cuvette without requiring micro cuvette).

- I. The instrument must have a guaranteed signal-to-noise specification of >750:1 for the Raman Band of Water – excitation at 350 nm, 1 sec signal averaging time..
- J. The instrument must be capable of collect at microsecond time intervals for phosphorescence applications.
- K. The software must have the option to measure multiple ramps and within each ramp must have the ability to collect at different data intervals.
- L. A solid sample holder with necessary accessories for powder, film, crystal , Gel sample,Powder should be quoted
- M. Suitable cuvettes for 3ml (02 SETS) sample should be quoted from OEM.

Warranty should be for 2 years for each equipment. Suitable PC (02 Nos.), Printer (01 No.) ,suitable Online3 KVA UPS for each equipment, with 30 min backup .

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