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Quotation Notice

No.DC/ST/Eq/56/14-15; Date: 12.03.2015

Quotations in sealed covers are invited for the following equipments.

Quotation Number: No.DC/ST/Eq/56/14-15; **Date:** 12.03.2015

Due date and time for receipt of quotations: 27.03.2015; 17.00 Hrs

Date and time for opening of quotations: 27.03.2015, 17.30 Hrs

Date up to which the rates are to remain firm for acceptance: 27.06.2015

Designation and address of officer to whom the quotation is to be addressed:

The Head,

Department of Chemistry, University of Kerala,

Kariavattom Campus, Thiruvananthapuram, Kerala, 695 581 - India.

Item 1:

Fluorescence spectrophotometer (Spectrofluorimeter)

Required Specifications:

Liquid and solid state fluorescence measurement accessories

Light source: Xenon lamp with shielded lamp housing.

Wavelength range: 200 nm to 900 nm

Bandwidth selection: from 1 nm to 20 nm.

Wavelength accuracy: ± 1.5 nm or below

Signal to noise ratio, Sensitivity RMS: 2500:1 or more

Accessories required: Computer with control Software: Emission and excitation spectrum measurement, quantitative measurement, Time based measurement, Phosphorescence measurement. Spectrum correction programme should be included.

Item 2:

Dynamic Light Scattering instrument with zeta potential measurement

Required Specifications:

Particle size range: 0.3 nm to 8 microns or more

Variable temperature range of sample cell : 1 °C to 90 °C or more.

Particle size accuracy: Measurement accuracy of $\pm 2\%$.

Sample concentration: Typical sample concentration from ppm to 40%.

Detector: High sensitive PMT or avalanche photodiode.

Sampling cells for size determination: system should work with removable glass cuvettes. Fixed cell design not acceptable. System should also work with disposable plastic cuvette cells.

Zeta potential measurement range: -200 mV to +200 mV

Electrical mobility measurement range: $-15 \mu\text{m}\cdot\text{cm}/\text{V}\cdot\text{s}$ to $-15 \mu\text{m}\cdot\text{cm}/\text{V}\cdot\text{s}$

Molecular weight measurement range: 1×10^3 to 2×10^7 g/mol

Software: Should have realtime display of auto correlation function, display of the median diameter, specific surface area, mode diameter, average diameter, standard deviation, coefficient variation, span value, percentage diameter, z-average, poly dispersity index, viscosity, electrophoretic mobility, etc. Computer and printer: Latest configuration of PC with laser jet printer.

Accessories required: Sample cells for particle size measurement and molecular weight: 2 numbers of glass cuvette cells of 4 mL capacity. 200 numbers of disposable plastic cuvette cells of 4 mL capacity; Aqueous sample cells for zeta potential measurement: 20 numbers of long life reusable plastic cells with carbon coated electrodes of 100 μL capacity.

Item 3:

Electrochemical Workstation / Potentiostat (for I-V & impedance analysis and for Solar simulator based studies)

Required Specifications:

Current ranges: $\pm 10\text{nA}$ to $\pm 500\text{mA}$ or more

Applied Potential range: $\pm 10\text{V}$ or more

Voltage Resolution: $1\mu\text{V}$ or better

Current Resolution: should be in femto ampere range

Frequency range: $10\mu\text{Hz}$ - 4MHz or more –

Bandwidth of electrometer: 5MHz or better

Electrode configurations: 2, 3, 4 & 5 electrode configurations.

Interface: USB

Floating facility is required.

Software's required.

1. Fuel cell/photovoltaic testing software including I-V, fill factor efficiency calculation etc..
2. Battery/Super capacitor testing software including Impedance measurement facility, constant load discharge, constant current constant power etc..
3. Corrosion software including LPR, Tafel etc.
4. Pulse software including DPV, NPV, RNPV, SWV etc
5. Impedance spectroscopy software. facility to find our L,C,R, Tan delta parameters.
6. Voltammetry software including CV, LSV etc..

Other Accessories required:

1. Platinum working electrode-1No.
2. Small volume Electro chemical cell with Platinum wire counter electrode.-1 no.
3. Glassy carbon electrode- 1No.
4. Ag/Agcl Reference Electrode-1No.
5. Computer with i-5 Processor, 2GB RAM, 500GB HDD windows operating system for data acquisition and post data analysis with Printer/scanner.

Item 4:

Solar simulator (for Photovoltaic studies using Electrochemical Workstation / Potentiostat)

Required Specifications:

Class ABA solar simulator with 150-300W 50mm*50mm target size with AM1.5 Air mass filter with downward facing stand.

Accessories required. Soft control of the operations with the Data Acquisition system

comprising Laptop with i-5 Processor, 2GB RAM, 500GB HDD windows operating system for data acquisition and post data analysis with Printer/scanner.

Item 5:

Gas Chromatograph (GC) with TCD for H₂ measurement

Required Specifications:

Molsieve 5A Column

Retention time: Retention time repeatability: < 0.06% or < 0.006min or better

Area repeatability: < 2% RSD

Oven operating temperature range: from Ambient temperature to 425 °C or above

Oven ramp rates: Maximum Temperature ramp rates: 50 °C/min or above

Ambient temperature rejection : < 0.01 °C per 1 °C

Must be able to set total flow range: 0 to 200 mL/min N₂ and 0 to 500 mL/min H₂ or He

Sensitivity: < 800 pg propane/mL using He carrier

Linear dynamic range: >10⁵ (± 10%).

Full digital dynamic range should allow all components to be quantified in a single run.

EPC control: Standard EPC for 2 gases (He, H₂, Ar, or N₂ matched to carrier gas type)

Pressure set points must be able to be adjusted by increments of 0.01 psi or better

Flow sensors: Accuracy: <± 5% ; Constant flow mode must be available

Accessories required: All ferrules, gas regulators, necessary chemicals, N₂ carrier gas cylinder, Filters, Pressure regulator, Toggle valves, Flexible tubing, Plastic Casing & capping. Assorted Fitting (SS Nuts & Brass Ferrules, TEE, Union etc.), PC and Printer.

The Associate Professor & Head,