TATA INSTITUTE OF FUNDAMENTAL RESEARCH
An Autonomous Institution of the Department of Atomic Energy, Government of India (A Deemed University)
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Ref:TIFR/PD/CA19-88/190878 January 22, 2020

ENQUIRY (Limited Tender)

To Vendors / Suppliers => By Speed Post/Courier

Dear Sirs

Please let us have your Quotation for the following:

S.No.	Item Description	Qty	UOM
1	Please find the detailed description in the attachment Cyclic Voltammetry.	1.00	NO

NOTE :

Please submit the quotation as per specifications.

Please mention your GST Registration numbers on the quotation, proforma Invoice and Bills. Quotation should indicate make, delivery period,guarantee/warranty exact taxes applicable, etc.

The payment will be made only after delivery of the supply, satisfactory installtion, commissioning and performance of the item/equipment. No Advance payment will be made except in case of furnishing valid Bank Guarantee from any nationalized/scheduled bank the B. G. shall be valid till the complete delivery is made at the site.

Quotation should be submitted in sealed envelope duly superscribing our enquiry reference and due date.

TIFR is a public funded research institute and is entitled to concessional rate of GST @ 5% for certain items supplied for research purpose vide notification no. 47/2017 dated 14th Nov, 2017. The offer should be submitted after fully considering the above notification.

Quotation sent by hand delivery / courier are to be deposited in the Tender Box kept at the Main Gate after obtaining stamp, date and signature of the Security Officer.

Due Date for submitting your offer is 03/02/2020.

Yours faithfully

T.I.F.R. HYDERABAD-500 107

J.RATHNA
Administrative Officer (C)

Annex – A (1)/(2)

ELECTROCHEMICAL WORKSTATION SPECIFICATIONS

A compact size expandable Potentiostat / Galvanostat is required that could be hand-carried across different labs as and when required. The specifications should be as follow:

Note: Vendor should be an authorized supplier of sophisticated high-precision Potentiostat/Galvanostat systems for past 10 Years or more with a

- A proven track record, and installation base in various national institutes.
- Standard quality certifications such (ISO 9001)
- 10+ past installations of similar systems in India in past two years.

Technical Specifications

- Compliance voltage: Standard ± 20 V or better at 400 mA current
  Note: Adjustable compliance voltage configurations will not be considered
- Maximum Output Current: ± 400 mA or better at 18 V.
- Current boosting option: Expandable anytime to ±10A measured Current or better with Current Booster.
- Output Voltage Range: ± 10 V or better
- Current Ranges: ± 10 nA to current range 100 mA in eight or more ranges
- Measured current accuracy: 0.0003% of current range (30fA at 10 nA range) Must be a default hardware configuration without any additional external accessories or current boosters
- Measured Potential Resolution: 3µV or better
- Maximum Scan Rate: 1000 V/s with **15 mV step - Required**
- Potentiostat Rise/fall Time: < 300 ns or lower
- Interface: USB interface for connection with PC.
- Input bias current: < 1 pA
- Bandwidth of electrometer: > 4 MHz
- Input impedance of electrometer: > 100 GOhm // 8 pF

Modular Configuration: Anytime a plug and play type expandability option should be available for following features:

- Electrochemical Impedance Measurements
- High Current Amplification Up to ± 10A
- Multiplexing options to conduct experiments up to 64 independent cells
- Bi-Potentiostat options from desired channel
- Single channel AC or DC light intensity control for LED Optical Bench without using an additional channel
- pH and temperature measurement
- External Triggering: ADC, DAC, TTL
- Connection of instrument to SPR for E-SPR studies
- Connection of instrument to E-SECM

The systems should be compatible with following accessories for anytime upgradation using 'single software' application:

a) Electro-catalysis measurements using fully automated RDE / RRDE set-up
b) Spectro-electrochemistry with one-software control of integration time
c) Photo-electrochemical Water-Splitting for HER, OER and Carbon Dioxide Reduction tests
d) Advanced Corrosion Analysis – EFM, SECM, Tafel, LPR, CPT, etc.
e) Photo-modulated solar cell characterization with optical bench – HUMO-LUMO analysis, Photo-current measurements, EQE/IPCE analysis, Charge extraction, Chopping, IMPS-IMVS etc.

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Electrochemical Cell Accessory

Three electrode set-up is required with following features:

- Gas tight construction with flangeless fittings with the vessel volume ranging from 5-50ml or better should be quoted.
- Vessel supplied should be chemically inert and proper vessel lid with the provision for inserting electrodes and gas purging options to be provided. Vessel should be air tight as possible.
- 3 mm GC working electrode, 3 mm platinum disk working electrode, Ag/AgCl reference electrode,and platinum wire counter electrode.
- 3 set of entire cell set up including all 4 electrodes mentioned aboveshould be quoted with baseplate and rod facility to hold the cell.
- One cell will be placed in glovebox and another cell will be used for room temperature (RT) studies.
- Vendor should offer dedicated electrode cables (2 set with minimum 1.5 meter length) and cell set up separately for glove box and RT studies

Electrochemical Software:

The Software to be provided with the Potentiostat / Galvanostat should be comprehensive, fully windows based with three-dimensional view of graphics and analysis software. Software should record current, voltage and time for cyclic and linear sweep voltammetry measurement. It should be possible to record current, voltage and time data in tabular format for each measuring point in voltammogram. Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below.

- Electrochemical Frequency Modulation,
- Cyclic and linear sweep voltammetry:
  Staircase cyclic and linear sweep voltammetry, True linear scan cyclic voltammetry, High-speed linear scan cyclic voltammetry
- Voltammetric analysis:
  Sampled DC, Normal pulse, Differential pulse, Differential normal pulse, Square wave, Potentiometric stripping analysis, AC voltammetry
- Cyclic & Linear Sweep Voltammetry – HER, OER, Kotecky –Levich plots for catalysis
- Linear Polarization, ECN, Critical pitting, EIS, Hydrogen Permeation, EFM, SECM, etc. for corrosion analysis
- HUMO-LUMO, I-V, IMPS, IMVS, PEC, IPCE, EQE, Mott-Schottky, EIS ---- Solar Cell Measurements
- Chrono-amperometry, chromo-coulometry and chromo -potentiometry ($\Delta t >$ 1 ms)
- It should have facility to display up to 10 or more plots simultaneously
- **Software Development Kit to control the workstation using LabVIEW Software**
- Sequential programming of different electrochemical methods and optional accessories
- Comprehensive database structure & powerful data analysis tool.
- Inbuilt electrochemical spread sheet&User programmable formulae to new plots.
- Powerful graphic engine with useful features such as individual Axis scaling, overlays, multiple Y axes, plot addition, zooming and rotation.
- Each plot should be saved as a vector image file to use directly in paper or presentation
- Software should have facility to record additional signal viz EQCM, bi-potentiostat etc.
- Import/export ASCII, Ready-to-use Vis & Generic interface for .Net applications should be included.

Computer:

Compatible branded Laptop with i5 configuration, Laser Color Printer should be quoted.
CPU Intel Core i5, RAM 8 GB RAM, HDD 1TB, GPU DirectX 9.0c compliant display adapter with 1GB RAM,

Warranty:

Warranty should be minimum of 3 years for all capital items.

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