NOTICE INVITING TENDER

Tender Notification No: NITR/PW/CR/2021/246   **Dated: 23/02/2021**

The National Institute of Technology, Rourkela invites bids from the eligible bidders for Procurement of **Multichannel Electrochemical Workstation** at Dept. of Electrical Engineering, NIT Rourkela.

Last date of Submission of Bid   : **01/03/2021**   **by**   **03:00 PM**

Opening date of Techno-commercial & Financial bid : **02/03/2021**   **at**   **03:00 PM**

For Details: https://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx

Contact: Prof. Shantanu Kumar Behera
          Department of Ceramic Engineering
          National Institute of Technology
          Rourkela-769008, Odisha
          Email: beherash@nitrkl.ac.in
        Phone: 0661 2462423

Bidding through: https://eprocure.gov.in/eprocure/app

Sd/-
Registrar

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA – 769 008, ODISHA

Procurement of Multichannel Electrochemical Workstation at NIT Rourkela

Sl. No.	Description of Goods/Service	Quantity
01.	Multichannel Electrochemical Workstation (As per the specification mentioned in Annexure-II)	01(One)

1. **Quantity Required** : As mentioned above (all technical specification provided in Annexure –II in Tender Documents)

2. **Delivery** : Within **60 days** from the date of purchase order

3. **Last date of submission of Bid** : **01/03/2021   by 03:00 PM**

4. **Opening date of Techno-commercial & Financial Bid** : **02/03/2021   at   03:00 PM**

5. The firm should not have been black listed at any time.

6. The submission of following bids by the tenderer should be through https://eprocure.gov.in/eprocure/app Please follow the guidelines as per the portal.

Procurement of Multichannel Electrochemical Workstation at Department of Ceramic Engineering, NIT Rourkela.

(SINGLE TENDER NOTICE NO: NITR/PW/CR/2021/246   Date: 23/02/2021)

Due on 01/03/2021 by 03:00 PM

---

7. **Liquidated damage clause** will be charged for any delay in supply of goods.

8. The validity of the tender shall be **90 days** from the date of opening of techno-commercial & financial bid.

9. Detailed advertisement including all tender documents is also available in our website at http://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx

10. NIT reserves the right to qualify or deny prequalification of any or all applicant without assigning any reasons.

Technical specifications for Multichannel Electrochemical Workstation

The multichannel electrochemical workstation must be capable of performing electrochemical research and characterization of materials used in batteries, supercapacitors, catalysts, solar cells, and photovoltaics. The procured workstation must possess the following attributes.

Parts	Specifications
1	**A dual channel electrochemical workstation with each channel functioning completely independent of the other, with each channel having the ability to characterize the following:** 1) Open Circuit, 2) Linear Scan Voltammetry, 3) Cyclic Voltammetry (Single), 4) Cyclic Voltammetry (Multiple Cycles), 5) Staircase Linear Scan Voltammetry, 6) Staircase Cyclic Voltammetry, 7) Staircase Cyclic Voltammetry (Multiple Cycles), 8) Multi-Vertex Scan, 9) Chronocoulometry, 10) Chronoamperometry, 11) Chronopotentiometry, 12) Recurrent Potential Pulses, 13) Recurrent Galvanic Pulses, 14) Linear Polarization Resistance (LPR), 15) Tafel, 16) Potentiodynamic, 17) Cyclic Polarization, 18) Potentiostatic, 19) Galvanic Corrosion, 20) Galvanostatic, 21) EN, 22) Split LPR, 23) Galvanic Control LPR, 24) Galvanodynamic, 25) Zero Resistance Ammeter (ZRA), 26) Potentiostatic EIS, 27) Galvanostatic EIS, 28) Mott-Schottky, 29) Constant Potential, 30) Constant Current, 31) GITT, 32) PITT, 33) Charge-Discharge. Compliance Voltage: ±12V or better. Adjustable compliance voltage configurations will not be considered. Compliance voltage add-ons or modules must be quoted separately. Current Compliance: ± 350 mA or better Applied Potential range: ± 10 V or better Current Ranges: ±10 nA to ±100 mA in minimum multiple ranges or better. Applied Current: ± 350 mA or better Measured Voltage Resolution: 5µV or better Applied Voltage Accuracy: ±0.2% of value or better Applied Current Resolution: 0.02% of current range or better Current Accuracy: **0.2%** at entire current range or better Rise/Fall time: <500 ns or lower Measured current resolution:0.001% or better Acquisition speed/ Data Sampling: 50,000 samples/second or better Auxiliary inputs/ outputs: 2 Analog Inputs and 1 Analog Output, 2 Digital Inputs and 1Digital Output for both channels Maximum Scan Rate: 300 V/s or better Electrometer Bandwidth: greater than 4MHz or better Input Impedance: 50GΩ or better Bias/Leakage Current: <10 pA or better Measured Voltage Range: ±10V **Safety:** The safety of unit/workstation must be ensured under all circumstances and the system shall be fail safe. The system must have its own inherent warning system during emergency related to power failure or other external factor. **Software for Data Acquisition/Analysis:** A suitable licensed software should be available for Data acquisition and analysis. Additional two copies of licensed software (CD-ROM)/**Flash drive** should be provided. The software must be downloadable to unlimited computers & fully windows based.

	Software capability: Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below: OCV, CV, LSV GEIS, PEIS –Electrochemical Impedance Spectroscopy Technique should be available with Equivalent EIS fitting circuit analysis. Analysis tools for CV, Battery, Corrosion–Rp and Tafel Fit, Solar IV- FF, Efficiency should be available. Battery Techniques like CC-CV, GITT and PITT should be available. Battery Capacity Determination Technique should be available. Corrosion: Linear polarization with Tafel Slope Analysis, Polarization resistance evaluation, Electrochemical Noise analysis, critical pitting technique, electrochemical frequency modulation, hydrogen permeation analysis etc. Battery & Supercapacitor Analysis: Rectangular CV analysis at varying scan rates for pseudocapacitor analysis, complete charge and discharge with built in integration and 'linkable' cut-offs, Galvanostatic charge discharge with cycle number vs specific capacitance plot, Voltage measurement on counter electrode, etc. Solar Cell Characterization: I-V plotting with automatic determination for max power point & fill factor, IMPS-IMVS evaluation, EQE / IPCE Analysis, Charge extraction, Photo-current response, Mott Schottky plots for single frequency scan, etc. Electro-catalysis: ORR analysis using RDE/RRDE at varying rotation speeds and built-in Kotecky-levich plot generation, HER and OER analysis for water splitting, Carbon dioxide reduction analysis, default technique for spectro-electrochemistry based LSV, CV and Chrono evaluation. 3D Based Live Plotting: Powerful graphic engine with useful features such as individual Axis scaling, overlays, multiple Y-axes, plot addition, 3D zooming and rotation. Each plot should be saved as a vector image file to use directly in paper or presentation. Minimum 10+ plot could be plotted simultaneously. **Computer:** A PC (Intel i7 Processor, 3 GHz Processor Speed, 16 GB RAM, 1TB HDD, 22-inch LED Monitor, Keyboard and optical mouse, 64 bit compatible) with latest version of Windows compatible operating software must be provided for smooth running of the unit/workstation.
2	**Electrochemical Impedance Spectroscopy:** The workstation must have electrochemical impedance spectroscopy (EIS) characterization facilities. In future EIS upgradation should be available without changing cabinet/chassis. Electrochemical Impedance Spectroscopy and Frequency Range: 10 μHz to 1 MHz or better. Frequency resolution < 10 ppm of the setting Sinus amplitude 0.5 mV to 2.5 V with 1 mV resolution 0.1% to 100% of the current range with resolution of 0.004% of the range. Mode single sine, multisine, FFT analysis, EIS quality indicator, built-in EIS simulation software, real time or post analysis fit-simulation, live issejous plots, live 3D plotting, real-time view of 3+ plots. Built-in analog integrator and IR compensation, capability to measure plot integrated charge and integrated current in real time.

3	**Dual mode Bipotentiostat:** One channel must be able to be converted to a dual channel potentiostat with which measurements on a working electrode can be performed sharing the same reference and counter electrode. The potential and current must have an accuracy of 0.2% or better. The potential range should be 10V. The module must allow maximum current of at least 50 mA. 1 unit of complete Rotating Ring Disc Electrode electrochemical cell 1 unit of complete Rotating Ring Electrode electrochemical cell
4	**Current Booster:** The workstation must be provided with an additional module for high current input (up to 10 Amp) with potential range (+/- 10 V) and compliance range of ±12 V.
5	**Electrochemical Cells:**
5.1	1 unit of complete flat cell kit [250 ml capacity with 1 cm^2 working area (exposure) as per ASTM standard] with Ag/AgCl reference electrode, platinum mesh counter electrode, and glassy carbon working electrode must be provided.
5.2	3 units of Small Voltammetry Cell kit: A 3-electrode Set-up: WE – 2 mm GC; CE – Pt; RE - Non-Aqueous Ag/AgCl and Aqueous Ag/AgCl; Vessel – 50 ml with teflon cap; inlet/outlet gas purging facilities must be provided.
5.3	2 units of Two electrodes Swagelok cell: Easy to assemble Swagelok cell in PEEK 9 or equivalent) body with bore diameter of 8 mm must be provided.
6	**Electrical Accessories:**
6.1	1 unit of Air conditioner of 1.5-ton capacity (split A/C inverter type) with installation and necessary cables for uniform temperature control of the unit/workstation during testing and measurement.
6.2	Power Backup: A 2 KVA or more online UPS from a reputed supplier with minimum 30 min battery backup must be provided for uninterrupted data acquisition and smooth operation of the unit/workstation.