

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032

NIT No. : IACS/SMS/AB/2018-19/94

Date: 07/02/2019

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful and eligible manufacturer/exclusive distributor/vendors for **Two Independent Channel Electrochemical Workstation**.

Part-I (Technical Bid) of the tender should contain technical specifications in detail as well as commercial terms and conditions. Part-II (Price Bid) should clearly indicate group-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelop, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Completed tender bids should reach the office of the **Registrar, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

Tender Notice No.	NIT No. IACS/SMS/AB/2018-19/94 Date: 07-02-19
Last date and time of submitting tender	February 28, 2019 upto 5.00 PM.
Pre-bid meeting(date, time & place) to discuss technical specification	February 20, 2019 at 10.00 AM (Room No. 113)
Date and time of opening tender (Technical Bids)	March 1, 2019 at 5.00 PM.
Place of opening tender	Roy Chowdhury Hall at IACS.
Date and time of opening of Price Bid	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.
Contact	Email: msab@iacs.res.in Tel.+91 33 2473 4971 [Ext. 1207]

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

Technical Bid Evaluation: The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

Opening of price-bid: The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

Quotations received incomplete or beyond the stipulated time will be summarily rejected.

Bidders should submit their past experience for supplying and successful installation of similar units to other research Institutes/Universities/other organizations in India and abroad. Please provide documentary proofs of such successful installation and supportive documents that the instruments are running successfully.

1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as 'TECHNICAL BID' on the outer cover of the envelope as already detailed above. **It should be clearly mentioned on the envelope as "Technical Specification for Two Independent Channel Electrochemical Workstation".**

Technical Specification for Two Independent Channel Electrochemical Workstation

A Multichannel System with possibility to accommodate upto total 12 potentiostat-galvanostat or more in one single chassis. It should be possible to control all the channels through one PC or upto three or less individual PC stations. Each channel should have following specifications. Price for each should be quoted separately. Vendor should be an authorized provider of sophisticated high-precision potentiostat/galvanostat systems for past 15 Years or more with:

- A proven track record in multiple countries and national institutes
- Standard quality certifications such (ISO 9001)
- 10+ past installations of similar systems in India.

A fully equipped expandable multichannel configuration with EIS and Bipotentiostat options for spectro-electrochemical studies is required with following specifications:

- No of Channels = 2 (Need at least one EIS channel and One channel with bi-potentiostat. Total expandability upto 12 channels)
- 2, 3 and 4 electrode configuration
- Maximum potential: ± 10 V or better
- Maximum current: ± 350 mA on each channel
- Compliance voltage: ± 15 V or better (adjustable configurations like "0-10V / ± 5 V" have to be defined separately)
- Measured current resolution: 0.0005% of current range (At 10 nA range expected resolution needs to be at least 50 fA or better)
- Galvanostat applied current range: 0.5 μ A to 350 mA
- Applied potential resolution: 150 μ V or better
- Applied current resolution: 8 μ V or better
- Bandwidth of electrometer: > 4 MHz
- Input impedance of electrometer: > 100 GOhm // 8 pF
- Potentiostat rise / fall time: < 500 ns
- Maximum scan rate: 1000 V/s with 15 mV steps

Electrochemical Impedance Spectroscopy: Qt. 1

- Applied Frequency Resolution: 0.005%
- At 1 Hz frequency, impedance of 0.01 Ω must be determined with 0.5° Phase accuracy & at least 0.5 % measured impedance accuracy. i.e – Measured impedance = $0.01 \pm 0.00005 \Omega$
- Frequency Range with PSTAT/GSTAT: 10 μ Hz to 1 MHz at a maximum current of ± 350 mA
- EIS Software Required – Real time fit-simulation, live lissejous plots, live 3D plotting.
- Preferred Option in near future – An Advanced EIS software that selects equivalent circuit by itself and allows touch free fitting and simulation of upto 100+ EIS data files in single run

Internal Bi-potentiostat Expandability Option for Each Channel: Qt. 1

An internal dual-mode bi-potentiostat option (on any one channel) is required that would convert the measurement channel into a double channel potentiostat. Measurements should be simultaneous on two working electrodes sharing the same counter and reference electrode. The bi-potentiostat feature should be functional in at least two modes. In the first mode, a fixed potential can be applied to the second Working Electrode while applying a potential step or a sweep to the first Working Electrode. In the second mode, a potential offset with respect to the first working electrode could be applied to the second working electrode.

Advanced Spectro-electrochemistry Set-up - Qt. 1

A fully integrated & synchronized ‘complete solution’ spectro-electrochemical system that can be used independently as a Spectrometer or as a Potentiostat/Galvanostat. **The package should include all cables, cell set-up, electrodes and accessories for fully integrated one click spectro-electrochemistry data generation using single software window.**

A D/HAL Light Source: A compact deuterium/halogen light source is required for the application. It should provide a good light output between 200 and 2500 nm for nearly all absorbance chemistry applications. The light source should be equipped with a software controlled shutter to enable or disable the light output.

A UV Spectrophotometer: The UV Spectrophotometer (Resolution – 2 nm or better) is required for applications in the UV/VIS wavelength range (from 200 nm to 850 nm). This instrument should be internally designed to work in combination with quoted multichannel potentiostat/galvanostat without any complex integration procedures and should be equipped with all dedicated spectro-electrochemistry protocols for plug n play analysis. The spectrophotometer should have options for individual control or could also be synchronized anytime with electrochemical measurements at desired voltage steps and integration time (2 ms to 500 seconds or better).

An advanced Spectro-electrochemical software:

- Single software control of electrochemistry and spectroscopy
- Automated lamp control: Automatic dark and reference
- Real Time 3D panel that collects the generated spectra not only during the electrochemical measurement but continuously at any time.
- Spectroscopic measurements shown in Counts, Absorbance, Transmittance or Reflectance during the electrochemical process with auto-subtraction
- Plot of Optical Spectra vs. Electrochemical Curves at a specified wavelength
- Plot overlay, peak integration, smoothing, subtraction, derivative curve, baseline fitting.
- 3D plotting of curves & export .csv of over-layed plots

Electrochemistry Cell: 0-90 mL Glass cell (3 no.) with base plate (3 no.) and stand rod (3 no.), Pt wire Counter electrode (3 no.), Ag/AgCl reference electrode (3 no), Suitable Lid for the cell and purge tube with valve (3 no.), 3 mm diameter Pt Electrode Tip (1 no.) and 3 mm diameter gold electrode tip (1 no.) including Holder and polishing kit.

Air tight and flow-through based Spectro-electrochemical Cell with specifications below:

- Nominal Aperture Area: 1 Cm²
- Optical Path Length (Electrolyte Thickness): 12 mm
- Max. Flow Chamber Volume: 1.75 mL
- Maximum Substrate Thickness: 4 mm
- Air tight with gas-in / gas-out: YES
- Minimum Substrate Size: 17 mm X 25 mm
- Fiber Connector: SMA 905, 6.35 mm Ferrule
- Irradiated Spot Size: 5 mm In Diameter, 19.6 mm² Area.

Software

The system software must have capability for hybrid measurements such as Spectro-electrochemistry, E-SPR, SECM, IMPS-IMVS, EQCM, etc. It should have TTL triggering, ADC, DAC based communication ports. The Software must be able to be downloaded to unlimited computers & fully windows based. Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below:

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 Koutecky-levivich plot generation, HER and OER analysis for water splitting, Carbon dioxide reduction analysis, default technique for spectro-electrochemistry based LSV, CV and Chrono evaluation.

Sensors: Automated protocol for CV and LSV analysis at varying scan rates, fully automated amperometric detection protocol.

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 Station:

A suitable branded Computer like Dell or Compaq or equivalent for system control & data acquisition should be offered with the system. It should have following minimum specs: CPU Intel Core i5, RAM 8 GB RAM, HDD 500 GB, GPU DirectX 9.0c compliant display adapter with 1GB RAM, TFT Monitor 21 inch, 101 Keys Keyboard, Optical Mouse, 3 USB Ports. Software should be freely upgradable in future. The model and the software capability offered should be well documented in the brochure/catalogue and should be available at Principal website.

Future Upgradation 1: A Multiplexer Module to allow Sequential Electrochemical Measurement from 4 to 64 independent Cells: Future Expandability.

Future Upgradation 2: A high current booster for a full-range $\pm 10\text{A}$ measureable current with $\pm 18\text{V}$ compliance at a current resolution of 0.0005% or better.

Warranty: 1 year + 2 years free AMC or 3 Years Manufacturer's Warranty Certificate.

Servicing facility within India is a must while service engineer stationed at Kolkata will be preferred.

A list of other places where the instrument has been installed should also be provided.

A compliance table (see below) must be prepared and submitted along with the technical bid.

Sr. No	Tender specification	Your offered instrument specification	Extent of compliance

Tender will not be accepted if the technical compliance chart is NOT provided following the above format.

2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as 'PRICE BID' on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: Price to be quoted on CIF Kolkata and also FOB basis.

3. BID SECURITY:

An Account payee Demand Draft of any of the Commercial Banks for Rs. 40,000 (Rupees Forty Thousand only) drawn in favour of "Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)" is to be furnished by the bidders alongwith Technical Bid, except Micro and Small Enterprises (MSEs) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or are registered with the Central Purchase Organisation or the concerned Ministry or Department.

Alternatively, the bidder shall have the option to furnish EMD in the form of Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee from any of the Commercial Banks. The Bid-Security should have at least 90 (ninety) days validity period beyond the final bid validity period.

In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

4. PERFORMANCE SECURITY:

An Account Payee Demand Draft on any commercial bank of India or Bank Guarantee (BG) of any Commercial Bank preferably located at Kolkata of 10% of the order value in the name of "Indian Association for the Cultivation of Science" is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money.

5. TERMS OF PAYMENT:

Payment will be made through irrevocable Letter of Credit in two instalments. 90% of the money will be released on submission of shipping of documents. Remaining 10% will be released after successful installation of the instrument.

6. GENERAL INSTRUCTIONS:

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
2. The tender should accompany a compliance chart.
3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally to visit the website (www.iacs.res.in/tender) for any amendment.
5. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
6. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
7. The model number, make and a printed literature of the product should be submitted positively.
8. Proposed delivery schedule should be mentioned clearly.
9. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
10. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
11. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
12. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
13. In case of any dispute, the decision of IACS authority shall be final and binding on the bidders.
14. In case of any litigation the matter will be dealt within the jurisdiction of the High Court of Calcutta only
15. For any clarification regarding technical specifications, information etc., please send your queries to Prof. Asim Bhaumik (msab@iacs.res.in).
16. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Acting Registrar