INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

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Technical Specifications :

POTENTIOSTAT/ ELECTROCHEMICAL SYSTEM with EQCM

"Sealed quotations (Technical and Financial bids separately) are invited from authorized suppliers along with the Manufacturer and Authorization Certificates for the specifications below of electrochemical system with EQCM."

TECHNICAL SPECIFICATIONS:

Electrochemical system/Potentiostat:	**A electrochemical workstation (upgradable to multichannel) with EIS and e-QCM capability** **Please quote the price for 2, 4 and 6 additional channels. USB Chassis may be quoted if required**
• Compliance Voltage	±20V
• Current Range (Full Scale)	±400 mA to 10 nA or better
• Output Voltage Range	±10V or better
• Measured current resolution	0.0003% at entire current range
Must be a default hardware configuration without any additional amplification	
• Measured Potential Resolution	3µV or better
• Potentiostat Rise/fall Time	1 µs or lower
• Interface	USB interface for connection with PC
• Multichannel	Upgradeable to multichannel
• Input impedance of electrometer	10^{11} Ω or better
• Maximum scan rate	200 V/s at 2 mV step height or better
• Input bias current of electrometer	20 pA or better

• Boosters	Compatible with boosters
• Additional accessory	All accessories (RE, WE electrodes, cells, and filling solutions) for the proper operation of instrument should be included as standard supply.

Independent EIS Configuration:

Applied Frequency Resolution	0.005%
	At 1 Hz frequency, impedance of 0.01 Ω must be determined with 0.3˚ Phase accuracy & at least 0.3 % measured impedance accuracy. i.e – Measured impedance = 0.01 ±0.00003 Ω.
Frequency Range with Potentiostat/ Galvanostat	1 MHz to 10 µHz or better at given current (±400 mA or better)
A built-in EIS Simulation	Required
live lissejous plots	Required
live 3D plotting	Required but not compulsory
real-time view of 10+ plots	Required but not compulsory
Supplier should provide an officially published contour plot of FRA when connected with similar Potentiostat/ Galvanostat from the same supplier.	Required

EQCM:

EQCM:	The instrument must be equipped with an EQCM module to perform Electrochemical Quartz Crystal Microbalance experiments with measurements in the sub µg/cm2 or better should be possible.

	Should include as standard supply • Suitable Software • Temperature-controllable QCM Cell • EQCM Flow Cell Reference Electrode (Ag / AgCl) • Au-Coated Quartz Crystal (5MHz)- 10 Nos • Flow cell with peristaltic Pump for eQCM flow cell • All required accessories to connect with the electrochemical analyzer should be quoted as standard supply
Additional accessories	• Different additional cells like other flow cells, immersion probes, and other required electrodes with the EQCM should quoted separately • All required accessories to connect with the electrochemical analyzer should be quoted as standard supply • 5 MHz C-coated Quartz Crystal, Wrap-around electrodes, qty 5 (may be **quoted** separately) • 5 MHz Fe-coated Quartz Crystal, Wrap-around electrodes, qty 5 (may be **quoted** separately)
• Oscillation frequency	In between 1-10 MHz or better
• Resolution	0.07 Hz or better
• Frequency range	80000 Hz or better

Electrodes and EC cells	A 3-electrode Set-up: Basic EC Cell Set up: Qt. 2 WE – 2 or 3 mm GC; CE – Pt Spiral or straight; RE - Ag/AgCl; Vessel - 50 mL PEEK; Gas-in/Gas-out option, Polishing Kit for polishing Electrodes. A Faraday Cage should be quoted as well. All these included as standard supply

Software:

Software:	The system software must have capability for hybrid measurements such as Spectro-electrochemistry, E-SPR, 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 for advanced sensor research (50+ modern electroanalytical techniques). • **Real time Plotting:** Powerful graphic engine with useful features • **Corrosion:** Linear polarization with Tafel Slope Analysis, Polarization resistance evaluation, Electrochemical Noise analysis, critical pitting technique, electrochemical frequency modulation, hydrogen permeation analysis, etc. • **Battery & Supercapacitors 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. • **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. • **Sensors:** Advance Sensor Research/ Development and Conducting polymers applications • **EQCM:** Suitable software to run the EQCM related analysis

Accessories	All accessories for the proper operation of instrument should be included as standard supply. Other important accessories can be quoted separately
Local Supply	All the pre requisition for installation like Branded PC (3 yrs warranty) of suitable configuration along with 1 nos. of 27” inch Branded monitor (3 yrs warranty), required UPS etc. should be supplied along with system.
Terms and Conditions	Supplier’s selection of incoterm FOB/FCA will be treated as DDP for this tender. Hence suppliers should quote the final amount of equipment as per DDP incoterm. • The duty exemption certificate, if needed, will be provided by the IIT

	Bombay as per applicability. • System performance should be demonstrated with necessary standards and calibration kits which will be provided by the vendor as part of standard delivery. • All the system components supplied, should have warranty for three years from date of installations (except mentioned earlier) and 2 years AMC after that including all labour cost. Payment of spare parts if necessary will be made on as and when required basis. • Warranty should include preventive maintenance kit, calibration kit. • No conditional warranty will be accepted. • Basic training for a period of one week after installation & commissioning of the equipment to technical personnel to be provided at our site. • On-site training of staff and students (at least twice in a year for 7 days each) during the first 3 years. • Good technical support should be provided after the installation of the instrument and the service engineer should be able to attend unlimited breakdown calls and should visit the installation site within 24 hours without fail. • Service support should be available for 6 days a week. • Training on troubleshooting the issues associated with instrumentation or application should be provided free of cost whenever required by the user. • Manufacturer should provide the service support details in Mumbai and India. Details of the service engineers and application specialists should be provided along with their experience on these kind of systems. • Details of the users (name, phone number and email ID) in India for the quoted instrument in the bid should be provided. • Instrument performance, quality of service and application support certificates from at least three existing users should be provided.

	We may provide unknown samples to the vendors for analysis on the quoted models to verify their claims on technical specifications, and may ask for technical presentation also and reserve the rights to reject any or all quotations based on the results.