



INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
PUNE

CLARIFICATION ON TENDER NUMBER - IISER/PUR/1345/17

ITEM DESCRIPTION- PROCUREMENT OF ELECTROCHEMICAL MICROSCOPY WITH LOCALIZED IMPEDANCE SPECTROSCOPY

Refer our Press Tender Notice No. IISER/PUR/1345/17 dated 01.01.2018 for procurement Electrochemical Microscopy with localized Impedance Spectroscopy. Tender Reference Number - IISER/PUR/1345/17.

Pre-Bid meeting was held on Jan 5th, 2018 at 2.30 PM and minutes of meeting is as under.

At the outset, the Chairman welcomed all the Members and the representative of the Prospective Bidders and briefed in general the scope of the Project and thereafter requested Assistant Registrar (S&P) to brief the vendors on the salient features of the commercial terms and the indenting Officer to read out the clarification sought by the Prospective Bidders and replied thereto as detailed in Annexure -II

The representatives present were satisfied with the replies given and it was informed that the corrections / additions / clarifications given, as discussed during the Pre-Bid Conference would be hosted on the website of IISER Pune and all the Prospective Bidders are required to take cognizance of the proceedings of the Pre-Bid Conference before submitting their bids as stipulated in the Bidding Documents.

The other terms & conditions of the notice issued on our IISER website www.iiserpune.ac.in will remain unchanged. No more correspondence in this regard will be entertained

The meeting ended with vote of thanks to the Chair

08.01.2018

Sd/-
Assistant Registrar (S&P)



IISER PUNE

**PRE-BID CONFERENCE FOR PROCUREMENT OF ELECTROCHEMICAL MICROSCOPY
WITH LOCALIZED IMPEDANCE SPECTROSCOPY**

TECHNICAL & COMMERCIAL QUERIES AND CLARIFICATION

TENDER NUMBER - IISER/PUR/1345/17

DATE : 08.01.18

S.No	Query/Clarification Sought	Clarification / Amendment
1	Chapter 4; Page 18 Au ultra-microelectrodes	Chapter 4; Page 18 It is removed from the tender
2	Chapter 4; Page 18 Number of Pt ultra-microelectrodes	Chapter 4; Page 18 Tender specification remain unchanged
3	Chapter 4; Page 18 Different sets of probes for LEIS	Chapter 4; Page 18 Au and carbon probes are removed from the tender

4	<p>Chapter 4; Page 19</p> <p>Substrates</p>	<p>Chapter 4; Page 19</p> <p>Only Au substrates (1 each for SECM and LEIS/AC SECM) should be provided. However a sample holder must be supplied with the provision to analyse any types of end user's sample</p>
5	<p>Chapter 4; Page 20</p> <p>Electrometer bandwidth: 10MHz or better</p>	<p>Chapter 4; Page 20</p> <p>Electrometer bandwidth: 1 MHz or better</p>
6	<p>Chapter 4; Page 20</p> <p>Integrated Electrochemical Impedance Spectroscopy: Frequency range from 10μHz to 1MHz or better with minimum AC voltage amplitude 0.1mV in the Potentiostatic / Galvanostatic Mode</p>	<p>Chapter 4; Page 20</p> <p>Integrated Electrochemical Impedance Spectroscopy: Frequency range from 10μHz to 1MHz or better</p>
7	<p>Chapter 4; Page 20</p> <p>Photomodulated impedance spectroscopy, GITT and PITT</p>	<p>Chapter 4; Page 20</p> <p>These terms are removed from the tender</p>
8	<p>Chapter 4; Page 21</p> <p>Number of Au and GC electrodes</p>	<p>Chapter 4; Page 21</p> <p>3 numbers (each) should be quoted and 2 numbers should be quoted as optional</p>
9	<p>Chapter 4; Page 21</p> <p>Number of reference electrodes</p>	<p>Chapter 4; Page 21</p> <p>3 numbers (each) should be quoted and 2 numbers should be quoted as optional</p>
10	<p>Chapter 4; Page 21</p> <p>Hg/Hg₂Cl₂ reference electrode with suitable</p>	<p>Chapter 4; Page 21</p> <p>If this electrode is not available, it should be substituted by another</p>

	bridge tube	reference electrodes listed in the tender (3 numbers)
11	Chapter 4; Page 21 Vibration free table under section 12	Chapter 4; Page 21 It is removed from the specification
12	Chapter 4; Pages 21 Specifications of ITO electrodes for spectroelectrochemistry	Chapter 4; Page 21 10 mm (W) × 50 mm (L) × 0.5 mm (T). Surface resistivity should be less than 15 Ohms/Sq
13	Specifications of Au and Pt mesh electrodes for spectroelectrochemistry	Total length of the wire = 50 mm, mesh area dimension = 5 mm (W) x 5 mm (L) x 0.4 mm (T)
14	Chapter 4 - Specifications	<p>Chapter 4 - Final specifications are appended below:</p> <p style="text-align: center;"><u>Electrochemical Microscopy with Localized Impedance Spectroscopy</u></p> <p>Technical Specifications General The proposed equipment should have single expandable positioning platform capable of performing SECM & LEIS. Single expandable platform capable of SECM and LEIS (or AC-SECM) and the system must be upgradable to SKP, SDC and OSP experiments.</p> <p>All the items in the quote must be accompanied by manufacturer's part number/model number.</p> <p>The equipment should have the provision to do following experiments</p> <ul style="list-style-type: none"> ▪ SECM Imaging (SECM): constant height, constant distance, constant current, potentiometric and impedance modes

- Probe Approach Curves (PAC)
- Probe Scan Curve (PSC): constant height, constant current, potentiometric, impedance
- Localized electrochemical impedance spectroscopy or AC-SECM
- Z probe constant current control
- Surface interrogation SECM
- TG-SC mode
- SG-TC mode
- Direct mode for electrochemical lithography

Positioning System

PC controlled motorized linear measuring stages

Travel distance: 100 mm or better, X, Y & Z axes with piezo positioner and closed loop control

X, Y, Z resolution: 100 nm or better with piezo positioner, closed loop control

Constant distance, constant current mode and constant height mode SECM.

In constant distance mode, force of contact should be minimized

The system should include AC-SECM mode for studies without electrochemical mediator.

Single software platform for all scanning probe techniques with lifetime license should be provided. 3D software with Multiple User License for life time needs to be provided. The software upgradation needs to be provided free of cost whenever available.

Vibration-resistant optical base employing both a honey-comb internal design and stiff steel surfaces.

High speed USB or Ethernet connection between the positioning system and the computer.

Specification of SECM probes

All probe's RG ratio should be ≤ 10

10 μ M Platinum probe: 10 Nos
25 μ M Platinum probe: 10 Nos

Electrochemical cell for SECM (low volume and high volume) with necessary counter and reference electrodes-and purging set up.

Different sets of probes (Pt) and electrochemical cell (with all the counter and reference electrodes and purging set up) should be supplied for LEIS or AC SECM modes.

Sample holders must be available to analyze end user's samples and it should have provisions to work with flat sheet, pellets and rod type samples.

SECM and LEIS (or AC SECM) electrochemical cell should be equipped to study any types of end user samples.

Standard sample substrates (Au) for SECM as well as LEIS or AC-SECM (separately) must be supplied. However a sample holder must be supplied with the provision to analyse any types of end user's sample

The probes for SECM and LEIS or AC-SECM should be compatible with the probe holder supplied

Complete video camera assembly should be included in the package.
Complete with operational manuals, cables, cell kit and polishing kit.

Scanning Electrochemical Software:

It should be possible to control the tip movement, scan speed, scan range etc. It should display the graphical representation of approach curves, line scan and array scan.

The software should have provision for tilt correction and topography correction.

It should be possible to use the potentiostat and galvanostat independently.

The potentiostat/galvanostat software should have facility to record additional signal viz EQCM, RRDE etc.

Import/export ASCII.

It should have facility to display minimum 4 plots simultaneously.

Comparison with previous experiments should be possible while experiments are in progress.

The software should support following basic electrochemical measurements: Cyclic Voltammetry, Sampled DC Voltammetry, Electrochemical Noise, Tafel Plots, Differential Pulse Voltammetry, Square Wave Voltammetry, Mott-Schottkey plot, and electrochemical methods like Electrochemical impedance spectroscopy, Chrono-Amperometry, Chrono-Coulometry & Chrono-Potentiometry.

The following features should be available

- Interactive visualization of SECM surfaces
- 2D and 3D Graphics:
- Color mapping
- Laplacian smoothing
- Stereoscopic 3D anaglyph imaging
- 2D and 3D FFT, auto sequencing of experiments, probe movement and area mapping should be available.
- SECM Imaging (SECM): constant height, constant distance, constant current, potentiometric and impedance modes
- Probe Approach Curves (PAC)
- Probe Scan Curve (PSC): constant height, constant current, potentiometric, all types of impedance modes
- TG-SC mode
- SG-TC mode
- Surface / Topography measurement Specifications:
- Complete surface profile data display and analysis tool
- Display modes for AC SECM: Impedance line-scan, area scan, point frequency scan, Bode and Nyquist
- Automated Approach curve & user defined scan parameters (displacement,

velocity, step scan/continuous scan mode, step size, number of data points).

- Software should include Corrosion software, Voltammetry software, Pulse software, Impedance software, EIS Equivalent circuit fitting software.

Technical Specification- Bi-Potentiostat

- The system should be supplied with the ability to measure a probe and a sample simultaneously (Bi-Potentiostat mode).
- Both the Potentiostat' s should work independently for general electrochemical applications, the necessary software package including Voltammetry, EIS, Corrosion Techniques should be included.

General Specifications

- Compliance Voltage: $\pm 12V$
- Applied Potential range: $\pm 10V$
- Applied Voltage Resolution: 300 nV or better
- Current Compliance & Maximum Current Range: $\pm 500mA$ or better
- Minimum Current range $\pm 4nA$ (or better) with current resolution of 120 fA or better.
- Input impedance: $10^{12} \Omega$ or better
- Maximum scan rate: 100V/s or better
- Electrometer bandwidth: 1 MHz or better
- Data acquisition speed: 500KSamples/s or better
- Input bias current: 5pA or better

- Should have the “floating” mode.
- Integrated Electrochemical Impedance Spectroscopy: Frequency range from 10 μ Hz to 1MHz or better

Specification of EIS Hardware:

Hardware and software for EIS measurements in potentiostatic and galvanostatic control, over a wide frequency range of 10 μ Hz to 1 MHz.

Potentiostatic and galvanostatic impedance modes should be available

Apart from the classical EIS, it should be possible to modulate other outside signals such as rotation speed of a rotating disk electrode.

It should be supplied with powerful fit and simulation software for the analysis of impedance data.

Frequency range in 10 μ Hz - 1 MHz

Input impedance: High Precision Electrometer Impedance & Bias current: 10 T Ω ms & 1 pA)

Electrometer bandwidth: 1 MHz or better

Input channels E and I from the potentiostat/galvanostat or X and Y external signals, AC amplitude 0.2 mV to 0.30 V rms or better

Potentiostat 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 voltammetric measurement.

It should be possible to record current, voltage and time data in tabular format for each measuring point in the voltammogram. Software should be capable of supporting a wide variety of electrochemical techniques: Cyclic & Linear Sweep Voltammetry, Linear Polarization, Differential Pulse, Sampled DC & Square Wave Voltammetry, Chrono amperometry, chrono potentiometry, chrono coulometry, Tafel, Potentio static/potentio dynamic, Galvanostatic/galvanodynamic, Charge-discharge techniques –constant power, constant resistance, constant current and potential mode, Mott-Schottkey etc.

Accessories:

Dedicated data station with i7 (64 bit) processor and 8GB Ram with 28 inch flat TFT screen (1 number) with 1 TB internal hard disk. An automatic duplex colour laser jet printer should be provided (1 number).

Complete with operational manuals, cables, cell kit, polishing kit and dummy cell,

Usual electrochemical cell should be provided (10 mL, 10 numbers) with following specifications

- 1) Teflon cap with options to insert three electrodes (10 numbers)
- 2) A suitable stand to position the cell: 10 numbers
- 3) Purge inlet and purge outlet: 10 numbers
- 4) Suitable purging tubes: 100 cm long
- 5) Au (2 or 3mm dia) electrode: 3 numbers and 2 numbers optional
- 6) GC (2 or 3mm dia): 3 numbers and 2 numbers optional
- 7) Reference Ag/AgCl (3M KCl) with suitable bridge tube: 3 numbers and 2 numbers optional
- 8) Hg/HgO (1M KOH) with suitable bridge tube: 3 numbers and 2 numbers optional
- 9) Hg/Hg₂SO₄ reference electrode with suitable bridge tube: 3 numbers and 2 numbers optional
- 10) Hg/Hg₂Cl₂ reference electrode with suitable bridge tube: 3 numbers and 2 numbers optional. If this reference electrode is not available it should be substituted by another reference electrode listed in the tender (3 numbers)
- 11) Porous frits for reference electrodes (should be compatible with the 7th item): 50 numbers
- 12) Quartz Crystals
9 MHz AT-cut: Gold as well as Platinum (50 numbers each)
Electrode Area: 0.2 cm²
Electrode Thickness: Au or Pt ~300 nm or more
- 13) For transmission mode of UV Vis spectroelectrochemistry suitable ITO electrodes (25 numbers, 10 mm (W) x 30 mm (L) x 0.5 mm (T), Surface resistivity should be less than 15 Ohms/Sq) should be provided. For transmission mode of UV Vis spectroelectrochemistry, Pt mesh (1 number, total length of the wire = 50 mm, mesh area dimension = 5 mm (W) x 5 mm (L) x 0.4 mm (T)) and Au mesh electrodes (1 number, total length of the wire = 50 mm, mesh area dimension = 5 mm (W) x 5 mm (L) x 0.4 mm (T) should be supplied.

14) RRDE counter Pt electrode: 1 number

Warranty: 1 year or more

OPTIONAL ACCESSORIES:

Scanning Kelvin Probe

Optical Surface Profiler

Scanning Vibrating Probe

UV-Vis NIR spectroelectrochemistry