

Dated 17th October 2022

GLOBAL TENDER

**Request for Quote for the procurement of Battery cyclers / Electrochemical systems
(two modules with low and high current capabilities)**

This is an RFQ (Request for Quote) for a research-grade *Battery Cyclers / Electrochemical systems* to be used at SSCU / IPC departments, IISc Bangalore.

Procedure:

1. Vendors will be required to submit a technical proposal and a commercial proposal in two **separate sealed envelopes**. Only vendors who meet the technical requirement will be considered for the commercial negotiation.
2. The deadline for submitting proposals is 7th November 2022, 5 PM (IST). The proposals should arrive as a sealed hard copy. Two separate envelopes, one with technical specs and compliance (amount / cost is masked) and another with the same along with the amount should be submitted. The two envelopes should be marked, 'technical bid' and 'financial bid' as separate envelopes. The technical bid envelope should accompany a pen drive which should contain all matters of the technical proposal.

The bids should be addressed to:

The Chairman
Department of Inorganic and Physical Chemistry
Chemical Sciences Building, Indian Institute of Science
Bangalore 560 012, India

The sealed bids should be sent to,

Prof. S Sampath
IPC Department
Chemical Sciences Building, Indian Institute of Science
Bangalore 560012
Email: sampath@iisc.ac.in
Tel: 080 22933315

with an email confirmation to,

Prof. Aninda Jiban Bhattacharyya
Solid State and Structural Chemistry Unit
Indian Institute of Science
Banglore-560012, India.
Office: 080-22932106
E-mail: anindajb@iisc.ac.in

3. The technical proposal should contain a technical compliance table with five columns.

- a. The first column must list the technical requirements in the order that they are given in the technical requirement below.
 - b. The second column should provide specifications of the instrument against the requirement (please provide quantitative responses wherever possible).
 - c. The third column should describe your compliance with a "Yes" or "No" only. Ensure that the entries in columns two and column 3 are consistent.
 - d. The fourth column should **clearly state the reasons/explanations/context** for deviations, if any. Without a clear explanation, stating "Yes" and "No" will not be considered.
 - e. The fifth column can contain additional remarks from the OEM. You can use this opportunity to highlight technical features, qualify responses to previous columns, or provide additional details.
4. The commercial proposal should have the price of the item. All the accessories, including wiring, adapters and software needed for the equipment to function as per the technical specification, must be listed in the quotation.
 5. As an option, please provide itemized cost for any suggested accessories/add-ons that may enhance the equipment's usability, capability, accuracy, or reliability. Vendors are encouraged to quote for as many add-ons as their portfolio permits.
 6. The commercial bid must include the price of the item in foreign currency / Indian currency, indicating the following separately:
 - a. Equipment price (three year comprehensive warranty should be separately quoted)
 - b. FOR / CIP / CIF -IISc Bangalore shipping
 - c. Total
 7. The vendors are encouraged to highlight the advantages of their equipment over similar equipment from their competitors.
 8. If multiple items can fulfill the requirements, vendors can submit multiple bids.
 9. Any queries / clarification may be directed to the faculty members given above.

Terms and Conditions:

1. Your quotation should indicate delivery terms, schedule, entry tax, and payment terms.
2. The validity period of the quotation should be at least 90 days.
3. The vendor is responsible for installing the item at the IISc campus.
4. The RFQ must include references to at least five previous installations of the quoted part / equipment. This is essential to understand the Vendor's capability in handling such equipment. Please provide the names and contact addresses of the referees so that they can be contacted independently if required. All other things the same, a greater number of references may be given preference.
5. The vendor should be able to repair and maintain the equipment once it is installed at IISc. Clarify if periodic (preventive) maintenance can be done by a trained on-site engineer or requires a specialist from the OEM. The vendor should have qualified technical service personnel for the equipment based in India and must assure a response time of less than 24 h. after receiving a service

request.

6. If maintenance must be done by OEM, as an additional option, provide the cost of an annual maintenance contract (AMC) for post-warranty period of three years. The AMC must cover one scheduled and one emergency visit per year. It must also indicate who will service the AMC, an Indian agent, or the OEM. The AMC cost must also include an itemized list of essential spares for the scheduled visits.
7. Necessary training to operate the procured item and required literature support should be provided without additional cost.
8. Vendors should undertake to support the item with spares and software bug fixes, if any, for the next five years.
9. Please indicate the warranty provided with the equipment. The vendor must make no travel claims for servicing during the warranty/guarantee period.
10. The lead time for the delivery of the equipment should not be more than two months from the date of receipt of the purchase order.
11. The intender reserves the right to withhold the placement of the final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all the above conditions without assigning any reason.
12. Wherever requested in this specifications sheet, data must be supplied along with technical compliance documents. Technical bids without supporting data will be deemed as technically non-compliant.
13. All guaranteed specifications will have to be demonstrated, in an active installation. Failure to demonstrate any promised specifications will be deemed as technical non-compliance.
14. Printed literature and published papers supporting all compliance to the prescribed specifications may be provided.
15. Technical evaluation by the institute must include a demonstration to verify the functionalities and capabilities of the item quoted. Any discrepancy between the promised and demonstrated specifications will be deemed technical non-compliance. If any need arises, the vendor must be ready to visit IISc for a techno-commercial discussion physically.
16. The technical specifications given below are highly desired. However, we reserve the right to lower technical specifications to obtain a more competitive price.

Technical Requirements:

The item should be a state-of-the-art research-grade battery testing module / electrochemical system with the following specifications:

A. Battery Cycler Specifications:

1. Two units of battery cyclers / electrochemical system with 16 channels in each. Half the channels should have high and remaining half should have low current ratings in each of the cyclers. The 16 channels should be accommodated in a single chassis. The two units should be identical in terms of current ranges and other accessories. The specifications for the two different current modules are given below.
 - a) High current module: 0.5-2A (max) in each channel (8 channels); multiple current ranges (4 to 5 current ranges) and the minimum current range of 100 μ A or less.
Voltage resolution measurement: min. 18-bit or absolute unit of measurement down to μ V scale.
Resolution measurement: min 18-bit / down to approx. 1 nA

- b) Low current module: 50-250 mA in each channel (8 channels); multiple current ranges (4 to 5 current ranges) and the minimum current range of 100 μ A or less.
 Voltage resolution measurement: 24-bit or absolute unit of measurement down to μ V scale
 Current resolution measurement: min 18-bit / down to approx. 0.1 nA
- 2. Voltage range: minimum \pm 5V or higher.
- 3. The units should be capable of carrying out measurements in both 2 electrode, 3 electrode configurations (separate working, counter and reference electrodes). Essentially, there should be provision to insert a reference electrode and the lead in the case of batteries, for example. If there is a possibility of four electrode measurement, it will be an advantage.
- 4. Electrochemical impedance spectroscopy (EIS) module integrated into the battery cyclers and
 - a) The EIS module should perform frequency response analysis in the range of 10 μ Hz-100 kHz or higher, simultaneously in all channels or at least 50% of the channels in high and low current modules (4 high current + 4 low current channels).
- 5. The battery cycler should perform all conventional electrochemical techniques under categories such as chrono methods (potentiometry / amperometry and coulometry), galvanostatic / potentiostatic intermittent titration techniques (GITT/PITT), voltammetry (linear, cyclic, pulse, differential), and other general electroanalytical techniques.
- 6. The system should also have the possibility for user-end macro development.
- 7. Holders for measurement of the coin, pouch, and prismatic cells.
- 8. Cables with different connection fixtures and sizes.
- 9. Provisions for the operation of cells under controlled temperature and humidity.
- 10. The control chamber should have provision to alter temperature / humidity and environment.
- 11. Calibration kits.
- 12. Facility for temperature measurement at or close to the battery top / bottom surface.

B. Software Controllability

- a. Cycler should be completely computer-controlled using dedicated user-friendly software. This software should achieve all measurements/data acquisition, calibrations, and troubleshoots (from a remote location) should be achieved using this software. The software interface should be capable of inputting and displaying measurement parameters, displaying measurement results in graphs, and loading and saving data to the host computer. A computer (windows 10 or higher version) and a monitor should be included for each of the instrument.
- b. Preference to the possibility of integrating third-party hardware (e.g., FRA, spectrometer) and control add-ons for the future.

C. Warranty: A comprehensive warranty of three years from the installation date for all components supplied by the bidder.

A DETAILED COMPLIANCE STATEMENT CONCERNING ABOVE MENTIONED SPECIFICATIONS SHOULD BE ENCLOSED ALONG WITH THE OFFER.