

**Request for Quote (India based vendors only) for the procurement of
Ultra-Sensitive Electrochemical STM- based break Junction (EC-STM BJ) Controller
(Last date: 29th September 2021)**

This is a Request for Quote (RFQ) from **Class I and Class II local suppliers/ manufacturers** only for the procurement of Fourier Transform Infrared spectrophotometer with variable angle specular reflectance measurement capability, for the Department of Inorganic and Physical Chemistry (IPC) of the Indian Institute of Science, Bengaluru.

Only the **Indian Original Equipment Manufacturer (OEM)** or their distributor shall submit a response demonstrating their capabilities to produce the requested equipment to the primary point of contact listed below. With respect to this tender, the rules laid out by the Government of India in order No. P45021/2/2017-pp-BE-II issued by the Public Procurement Section, Department or Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, dated 4th June 2020 will be followed. The bidders must go through the Government of India order stated above and follow all the rules and regulations therein.

Relevant definitions as per Government of India order:

- **Class-I local supplier** - A supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%.
- **Class-II local supplier** - A supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%.
- **Local content** – The amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, in percent.

I. Procedure:

1. Vendors will be required to submit a technical bid and a commercial bid in **two separate sealed envelopes**. The technical bid should contain all commercial terms and conditions, except the price. **Only vendors who meet the technical requirement will be considered for the commercial negotiation.**
2. The covering letter should clearly state that whether the vendor is a Class-I or Class-II local supplier distinguished by their “local content”. Failing this the bid will be automatically rejected.
3. The vendor to state the percentage of the local content and provide self-certification that the item offered meets the minimum local content requirement. They should also give details of the location(s) at which the local value addition is made.
4. Sperate detailed justification needs to be given to substantiate the qualification as Class 1 and Class 2 suppliers and the intender reserves the right to cross-check the factual validity of the same and one if some foreign parts or equipment is being put forward then please submit the “*bill of material*” details for the same for evaluation.

5. The technical proposal should contain a duly signed compliance certificate (please see the attached compliance certificate format below).
6. Items in addition to that listed in the technical table that the vendor would like to bring to the attention of the committee, such as data sheets, technical plots etc. can be listed at the end of the compliance table. Vendors are also encouraged to highlight the advantage of their tools over comparable tools from the competitors.
7. The commercial bid must include the price of the item in Indian currency, inclusive of all discounts. All accessories needed for the instrument to function as per the technical specification must be listed. Please provide the itemized quotes for the instrument and any other attachment/accessory.
8. Comprehensive warranty for all the items must be 2 years (calculated from date of installation and commissioning of the instrument).
9. The commercial bid should indicate the following separately: (a) equipment price (b) optional items (c) Freight and insurance cost (d) Shipping cost and (e) the Total cost.
10. List of customers and references: The Bidder should have supplied similar equipment in in **Govt. of India funded institutes (IITs, IISc, IISERs and NITs) and central universities**. Please provide the details and contact information.
11. **The quotations should be on FOR-IISc Bangalore basis in INR only. Please quote the price of each optional line item, separately.**
12. The deadline for submission of the bids is **29 September 2021, 5:30 pm Indian Standard Time**.
13. Quotations should arrive at the following address:

The Chairman
Department of Inorganic and Physical Chemistry
Indian Institute of Science
Bangalore, INDIA-560012.
Email: office.ipc@iisc.ac.in
Tel: +91-80 2293 2382.

Any questions or clarifications can be directed to:

Dr. Veerabhadrarao Kaliginedi
Assistant Professor
Room No: A104
Department of Inorganic and Physical Chemistry
Indian Institute of Science
Bangalore, INDIA-560012.
Email: vkaliginedi@iisc.ac.in
Tel: +91-80 2293 3185.

II. General terms and conditions:

1. The decision of the purchase committee will be final. The Institute reserves the right to accept or reject any bid, or to annul the bidding process and reject all bids, at any time prior to the award of contract without thereby incurring any liability of the affected bidder or bidders.
2. The quote must also include references of 5 previous installations of the similar equipment in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently. Details of such systems with model numbers and users should be provided. The references can be used to disqualify vendors with poor track record of service, build quality, system performance or poor availability of spares.
3. The bidder must also submit another list of customers where similar systems have been installed.
4. The Bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect should be provided.
5. The vendor should be able to repair and maintain the equipment once it is installed. Clarify if periodic (preventive) maintenance can be done by a trained on-site engineer (i.e. IISc employee) or requires a specialist from the OEM. The bidder should have qualified technical service personnel for the equipment based in India and must assure a response time if <24 hours after receiving a service request.
6. If maintenance must be done by OEM, as an additional option, provide cost of an annual maintenance contract (AMC) for 3 years, post warranty. The AMC must cover one scheduled and one emergency visit per year. The AMC cost must also include an itemized list of spares that are essential for the scheduled visits.
7. All the quotations must be valid for at least 90 days at the time of submission.
8. The quotations should clearly indicate the terms of delivery, delivery schedule, tax, and payment terms.
9. After the award of purchase order, the vendor must provide an Order Acknowledgement within 30 days from the receipt of the Purchase Order.

10. The lead-time for the delivery of the equipment should not be more than 3 months from the date of receipt of our purchase order.
11. 100% payments will be released after the completion of delivery and satisfactory installation subject to TDS as per rules. As per GFR no advance payment can be made to domestic vendors, unless an equal amount of bank guarantee is provided.
12. The bidder is responsible for the installation of the equipment in the IISc campus.
13. Necessary training to operate the procured setup and required literature support (in English language) should be provided without additional cost.
14. Bidders should undertake to support the system with spares and software bugfixes, if any, for the next 5 years.
15. Please indicate the warranty provided with the tool. No travel claims must be made by the vendor for servicing during the guarantee/warranty period.
16. Wherever requested in this specification sheet, data must be supplied along with the technical compliance documents. Technical bids without supporting data will be deemed as technically non-compliant.
17. All guaranteed specifications will have to be demonstrated, upon request, in an active installation. Failure to demonstrate any promised specifications will be deemed as technical non-compliance.
18. Printed literature and published papers in support of all compliance to the prescribed specifications may be provided.
19. Technical evaluation by the institute must include demonstration to verify functionalities and capabilities of the system quoted. Any discrepancy between the promised specifications and demonstrated specifications will be deemed as technical non-compliance. If need arises, the vendor must be ready to physically visit IISc for a techno commercial discussion.
20. 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.

III. Technical requirements for Ultra-Sensitive Electrochemical STM- based break Junction (EC-STM BJ) Controller:

Controller capabilities hardware and software: This controller will be used measure the conductance through single molecule junction under ambient conditions in liquid environment (both electrochemical and nonelectrochemical environment). The system must be able to control and synchronize a stepper motor, movements of a piezo stack while measuring current. The ramping of the piezo stack should be controlled by the current data so that the ramping direction can either change, or halt.

The system should be able to measure large sets of data (few thousands of curves) for the following type of experiments:

1. Current-distance spectroscopy (50uA to 1pA with sampling rate >20 kHz) under electrochemical and nonelectrochemical conditions.
2. Current-Voltage spectroscopy during the break junction experiments (At least 10 I-V curves per one stretching cycle (i.e., one current-distance trace), with high data sampling rate > 20 kHz and must be able to measure large sets of data).
3. Piezo movement modulation based single molecule conductance measurements (should be able to control the piezo movement within few Angstroms precision).
4. Thermo-power measurements. If available, an option to control the temperature of the substrate should be provided.
5. All above experimental modes should be as per user specifications and should allow further modifications (both hardware and software).

Bi-Potentiostat module for electrochemical STM-based Break junction measurements:

- Bi-Potentiostatic mode, i.e. control of the voltage difference between two working electrodes with respect to a reference electrode.
- Multiple feedback speed settings (>4)

Required measurable Dynamic current range:

- Current Ranges from 100uA to 1pA
 - One Linear and one Logarithmic i-v converters that covers the whole current range.
- Sampling rate >100 kHz
- Resolution 16bit
- At least 2 current channels.
- Each channel should have the possibility to be biased relative ground.
 - At least one channel should have a bias voltage dynamically updated using waveforms

Piezo Stack Controller:

- Controllable voltage with a range of more than 0-10V
 - Dynamically updated using waveforms (>100kHz sampling rate)
- True Analog Ramping from 1mV/s to 100V/s (i.e. not digitized steps)

- Tunable Ramp limits
- Maximal Range (upper limit relative lower limit) > 2V
- External triggering sources
 - For switching the piezo ramping direction based on the measured current from either channel
 - For pausing the piezo ramping based the measured current from either channel

Accessories: All necessary accessories like low noise cables with suitable connectors (as per user specification), calibration accessories should be provided.

Analysis software: Analysis software should be able to analyse big data sets of single molecule conductance measurements (current-distance curves, current-voltage curves and etc). Analysis software should have options to build conductance histograms (1D and 2D conductance histograms), correlation analysis and other advanced statistical methods to analyse single molecule conductance data. Should allow further programming modification.

Possibility for the further modifications and customization: System (both hardware and software) should be modular and should provide possibility for the additions and modifications for the future single molecule experiments. Should be compatible with the existing EC-STM BJ hardware in our laboratory.

Compliance certificate

Ultra-Sensitive Electrochemical STM- based break Junction (EC-STM BJ) Controller				
S.No	Technical specification	Yes	No	Extent of deviation and reason for deviation
1	Current-distance spectroscopy (50uA to 1pA with sampling rate >20 kHz and must be able to measure large sets of data> 10000 curves) under electrochemical and nonelectrochemical conditions.			
2	Current-Voltage spectroscopy during the break junction experiments (At least 10 I-V curves per one stretching cycle (i.e., one current-distance trace), with high data sampling rate > 20 kHz and must be able to measure large sets of data).			
3	Piezo movement modulation based single molecule conductance measurements (should be able to control the piezo movement in few angstrom precision).			
4	Thermo-power measurements. If available, an option to control the temperature of the substrate should be provided.			
5	All above experimental modes should be as per user specifications and should allow further modifications (both hardware and software).			
6	<p>Bi-Potentiostat module for electrochemical STM-based Break junction measurements:</p> <ul style="list-style-type: none"> • Bi-Potentiostatic mode, i.e. control of the voltage difference between two working electrodes with respect to a reference electrode. 			

	<ul style="list-style-type: none"> • Multiple feedback speed settings (>4) 			
7	<p>Required measurable Dynamic current range:</p> <ul style="list-style-type: none"> • Current Ranges from 100uA to 1pA <ul style="list-style-type: none"> ○ Linear and Logarithmic i-v converters that covers the whole range. • Sampling rate >100 kHz • Resolution 16bit • At least 2 current channels. • Each channel should have the possibility to be biased relative ground. <ul style="list-style-type: none"> ○ At least one channel should have a bias voltage dynamically updated using waveforms 			
8	<p>Piezo Stack Controller:</p> <ul style="list-style-type: none"> • Controllable voltage with a range of more than 0-10V <ul style="list-style-type: none"> ○ Dynamically updated using waveforms (>100kHz sampling rate) • True Analog Ramping from 1mV/s to 100V/s (i.e. not digitized steps) <ul style="list-style-type: none"> ○ Tunable Ramp limits ○ Maximal Range (upper limit relative lower limit) > 2V • External triggering sources <ul style="list-style-type: none"> ○ For switching the piezo ramping direction based on the measured current from either channel ○ For pausing the piezo ramping based the measured current from either channel 			

10	<p>Analysis software: Analysis software should be able to analyse large data sets of single molecule conductance measurements (current-distance curves, current-voltage curves and etc).</p> <p>Analysis software should have options to build conductance histograms the following histograms form current-distance spectroscopy</p> <ol style="list-style-type: none"> 1. 1D and 2D conductance histograms. 2. Plateau length histograms 3. Correlation analysis and other advanced statistical methods to analyse the single molecule conductance data. 4. Analysis program should allow further programming modifications by the users. 			
11	<p>Possibility for the further modifications and customization: System (both hardware and software) should be modular and should provide possibility for the additions and modifications for the future single molecule experiments. Should be compatible with the existing EC-STM BJ hardware in our laboratory.</p>			