

Department of Chemical Engineering  
Indian Institute of Technology  
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October 12, 2011

IITD/BCHE/Stores/PLN03/BCHE/2011-2012/microcal

Dear Sir,

Sealed Technical and Commercial Quotations are invited separately for the Purchase of Microcalorimeter of the following major specifications. You should quote for various options as indicated in specifications and other items available with the instrument. Your quotation should reach latest by **November 10**, 2011 by 5:00 PM to the Head of Department; your specifications should be superscripted by our reference number.

**Technical Specification of low volume Micro-calorimeter:**

The isothermal titration calorimeter should be low volume, robust and easy to handle. It should have been literature proven and accepted to give accurate thermodynamic parameters for a diverse range of protein and nano-particle studies. It should have the following features.

1. **Cell:** Volume should low about 200  $\mu$ l. The cell must be non-interacting with proteins, nano particles. It should have good conductivity to facilitate the internal measurements correctly by the instrument. It should be able to work in a wide range of pH and other chemical and salt concentration conditions.
2. **Injection Syringe:** It must be able to automatically deliver small and accurate volumes (up to a fraction of micro-liter) of titrant into the reaction cell. The total syringe volume may vary upto a of maximum 60  $\mu$ l.
3. **Stirrer:** Should have a facility to stir at variable speed. The machine should be able to provide amount of energy input due to stirring.
4. **Heating/cooling unit:** The calorimeter should be capable and convenient enough to carry out the experiments over a wide range of temperatures including below and above the room temperature. The heating/cooling unit should be internally built in, rather than using any external water bath or such other unit.
5. **Reference Cell:** Both the sample and reference cells must have been taken care properly to have reliable results of binding and thermodynamic parameters.
6. **Cleaning of Cell:** The calorimeter should have all the hard ware for easy cleaning the reaction chamber to get a clean cell that is well suited for an immediate next experiment and the requisite corresponding software too. An integrated module (both hard ware and soft ware) that helps to clean the reaction cell rapidly between the experiments should be provided.

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**7. Hardware and Software:**

The instrument must have well proven hardware for carrying out the titrations in terms of pipetting, injecting, titrating, cleaning, calculation of heat due to stirring, change in heat due to reaction/interaction etc. It should be able to use various thermodynamic models and report thermodynamic properties like enthalpy change, free energy change, change in heat capacity etc.

**8. Accuracy of measurements:** The system should be sensitive enough to the measurements, particularly to the heat changes of minute/micro in nature and should have high operational stability and yield accurate and consistent data and results.

(a) Detectable heat: Minimum at least:  $0.1 \mu\text{J}$  and Maximum At least  $650 \mu\text{J}$

(b) Temperature Stability: at least  $\pm 0.005^\circ \text{C}$  at room temperature

All these should be demonstrated at the time of installation. The vendors must supply the evidence through the published data in international journals.

**9.** Preferable to have capabilities to upgrade the system at a later stage, when need arise.

**10.** Accessories required: A list and price of extra two to three sets of nonconsumable/consumable accessories should be mentioned. A typical endurance of the set should be mentioned.

**11.** Required Power back system and required specifications of computers should be mentioned. If you are providing computer, price should be mentioned separately in the price bid.

Other :

(i) The application aspects of the instrument should have been explained using some proven example systems, particularly based on proteins. The claimed specifications should be supported by a proven and verified document and/or data and all these should be verifiable when installed in our laboratory and your installation expert must show that the claimed specifications are all met, failing which the machine will not be accepted.

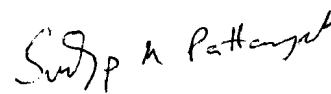
(ii) Should have proven record of its functioning and all other features of the instrument, particularly being acknowledged through the studies carried out using proteins. This may be shown through the published literature with peer review, particularly in the Journals of international repute.

(iii) An appropriate training should be given to one of my students in our laboratory. All the necessary technical support should be provided to maintain the instrument at our site, which may be required from time to time, due its use over a period of time.

- (iv) Should have proven record to support the trouble shooting at our site and application support and help to the user in need. Commitment for extended periods of such support to us at our lab for not less than three to four years beyond the warranty period is expected. Should provide the details of your service strengths to maintain and/or trouble shoot or provide service to this equipment, in order to reduce the machine down time
- (v) Please provide a list of the users of such instrument preferably in India and feed back from them if any.

### Terms and Conditions

1. Letter from the manufacturer specifically to quote for this tender is to be attached for authenticity of dealership/ agency and the dealer should be authorized service provider.
2. Sealed quotations in separate envelopes of Technical and Commercial bids kept in one sealed outer envelope should be submitted
3. Special discount/ rebate wherever admissible keeping in view that the supplies made for educational purposes in respect of the public institution of national importance may please be indicated.
4. Taxes, terms and conditions should be clearly mentioned. The rates quoted must be at *CIF Delhi price*.
5. Payment terms and conditions should be clearly mentioned. No advance payment is encouraged by IIT Delhi.
7. Firm MUST provide a compliance statement vis-à-vis specifications in a "tabular form" clearly stating the compliance and giving justification, supported by technical literature with clear reference of page number, paragraph or lines. This statement must be signed, with the company seal, by the tendered for its authenticity. Any incorrect or ambiguous information found submitted will result in disqualification of the tender. The quotation should be complete in all respects (as per IIT-Delhi rules).
6. The Institute/ purchase committee has the right to accept or reject any bid or all quotations without assigning any reason whatsoever.
8. Sealed quotations in separate envelopes of Technical and Commercial bids kept in one sealed outer envelope (super-scribed "Quotation for **Microcalorimeter**") should be addressed to Head of Department Attn: Dr. Sudip K. Pattanayek, Department of Chemical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi 110016, INDIA and should reach by 5.00pm **November 10, 2011**

  
Sudip K. Pattanayek