Tender Notification for procuring an automated low-volume isothermal titration calorimeter (ITC) at the Indian Institute of Science, Bangalore.

Quotations are invited to procure an "automated low volume isothermal titration calorimeter" on CIP Bengaluru Basis. The quotation must indicate the terms and conditions of delivery, delivery schedule, entry tax, payment terms, warranty coverage etc. The quotation should be submitted in two parts: Part I (Technical bid) and Part II (Commercial bid). The technical bid should be exactly the same as the commercial bid except that prices are included. Technical bids should have item-wise compliance report of all specifications. The commercial bid should have pricing for each of the items quoted in the technical bid. Prices quoted should be inclusive of all taxes/duties. The offer should be valid for a period of at least 60 days from the date for submission of quotes. **The last day for submitting the bid is 26 May, 2023.**

Specifications for 'automated low-volume isothermal titration calorimeter (ITC)'

The system must be equipped with a control unit, wash module, auto-pipetting syringe with tower filling and assemblies, injection syringes and other start-up accessories, necessary software for instrument control, operation, data analysis, viewing and enabling printing enabling accurate determination of thermodynamic parameters such as binding constants, reaction stoichiometry, enthalpy, entropy etc. with following applications and detailed specifications.

Applications: Characterization of molecular interactions of small molecules and polymers with proteins, antibodies, nucleic acids, lipids and other biomolecules, Lead optimization, Assessment of the effect of molecular structure on binding, Enzyme kinetics, Assessment of biological activity etc. Determination of thermodynamic characteristics of interactions between any two molecules/ions/macromolecules in terms of binding parameters like Kd- Binding affinity in range of millimolar to nano-molar, n- Number of binding sites, Multiple and different binding sites, ΔH- Enthalpy and ΔS- Entropy of binding.

Measuring principle: Direct measurement of heat released or absorbed during a binding event with heat compensation and detection via power feedback.

Cell configuration: Coin-shaped non-capillary cells which provide a large and symmetric surface area that maximises cell contact with attached Peltier elements so as to provide faster equilibration, faster response time, and better sensitivity.

Cell type: Fixed cell with reaction volume of ~200 µL (less is preferred) and a maximum sample loading volume, not exceeding ~ ± 20 % of reaction volume (280 µL) in non-automated mode. Cells must be enclosed in an adiabatic chamber, with ~200 µL cell volume.

Cell Material: Should be made with inert alloy which should not react with non- metal and metal ions such as carboxylates, phosphate ions, silver, gold, and magnesium, detergents and also should not react with thiol compounds. Further, the material should not adsorb biomolecules such as oligomeric and aggregated proteins, large nucleic acids etc. The cell material should also be highly resistant to a wide range of pH (2-12) conditions, organic solvents, resistant to acid, base, and detergent based cleaning materials.

Samples: In solution state including turbid samples. Detectable heat range: 50 ncal to ~ 10.0 µcal

Injection syringe capacity: ≤ 40µL
Equilibration time: ≤ 6 min (lesser will be preferred) between 5°C to 25°C

Minimum injection volume:

User-selectable Feedback Mode: Multiple feedback mode option should be available to cover broader range of binding reactions.

Sensitivity: Base line noise level measured (RMS average) at less than 0.15 nano calories/s.

Response time: The system should be capable to provide user selectable response times with a minimum response time ~ ≤ 8 seconds.

Mixing or stirring speed: The system should have multiple mixing speed options (rotations per minutes, rpm) with maximum stirring speed up to 1500 rpm.

Operating temperature range: Should be able to operate in the range 2°C to 80°C with temperature stability ~ ±0.00012°C at 25°C.

Equilibration option: Fast equilibration and auto injection options should be available.

Binding constants detectable range: Should be able to detect interactions with binding constants in the range of sub- millimolar (10^2 M^{-1}) to nano-molar range (10^9 M^{-1}) [for normal binding] and 10^2 to 10^{12} M^{-1}[for competitive binding].

Pipette assembly: Automated and controlled by instrument control software to minimize sample loss or introduction of air bubbles encountered during manual filling.

Temperature control system: Peltier controlled system.

Injection syringe and wash module: Purging options to remove air bubbles during loading on to injection syringe and compatible with cleaning accessories. Washing and cleaning of cell and syringe should be automated. The injection volume precision is <1% @ 2.0 µL.

Service and Maintenance: (a) There should be at least one service engineer and one application scientist based in India trained on the same quoted instrument. (b) The instrumentshould have a minimum three years of warranty (one year of manufacturer warranty + 2 years of extended warranty) from the date of installation of the instrument. (b) Instrument should have a guarantee of at least five years and should have frequent visits from both service engineer and application scientist. (c) An user's list should be provided highlighting the installation of similar equipment in other research institutes in India in the recent past. (d) A good record in supply and service to other research institutes will be considered as a positive point for a particular company.

Software: Should be capable of running instrument, injector control, sample loading the injector, providing user- selectable binding models, and data merging like: single site, two site, sequential site, competitive site, and enzyme kinetics. Non-linear least square analysis of the data should include calculations to correct for the excluded concentrations of the macromolecules and ligands during each injection. It should be easy to export and use data in other formats.

Computer: a. Computer and necessary software for operation, data collection and analysis, viewing should be provided. b. Analysis software: should provide copies of offline analysis software and should not require a separate software supporting license.

Necessary Accessories: All necessary accessories should be supplied with the instrument, as per standard package offered, including user manuals. Bottle kits, Bottling tubing-external, Filling port adapter with needle, extra tubing sets, drip tube, syringe, wash module, drip tube, cleaning device and O-ring. Also additional injection syringe and an additional pipette assembly must be provided.

Installation: The machine along with accessories should be installed in MBU, IISc and made fully functional by the company or through its authorized agents. The machine acceptance will involve trouble free operation and demonstration of the capability of the system for which necessary consumables to be supplied along with the system.

Important: Please note that systems with proven record for usage in labs within India are desirable. Provide the users list (Worldwide and in India) and the Service and Application support structure in India (Bangalore).

The documents may be addressed to the Chair, Molecular Biophysics Unit (Attention: Prof. Siddhartha P. Sarma), Indian Institute of Science, Bangalore 560 012. Last date for receiving queries: 19 May, 2023. Please email chair.mbu@iisc.ac.in, CCed to office.mbu@iisc.ac.in