

**Global tender notification for the procurement of
a Research Grade FT-IR spectrophotometer with variable angle specular reflectance
measurement capability
(Last date: 06 September 2021)**

GTE Approval No. IISc-GTE-2021-074

Quotations are invited for the procurement of a research grade Fourier Transform Infrared spectrophotometer with variable angle specular reflectance measurement capability, along with following technical specifications on C.I.P. Bangalore basis (by Air Freight only). The quotation must mention the terms of delivery, delivery schedule, estimated delivery date, and payment terms. The duly signed tender must be submitted in two separate sealed envelopes: one containing the technical bid and the other containing the commercial bid, both of which should reach us on or before 17:00 hours on Monday 06 September 2021.

The bids should be addressed to

The Chairman

Department of Inorganic and Physical Chemistry,
Indian Institute of Science, Bengaluru,
Karnataka – 560 012, India.

Kind attention: **Dr. Anoop Thomas**

The sealed bids should be sent to:

Dr. Anoop Thomas

Department of Inorganic and Physical Chemistry,
Indian Institute of Science, Bengaluru,
Karnataka – 560 012, India.

Ph: +91-080 2293 3351

Email: athomas@iisc.ac.in

Procedure:

1. Vendors will be required to submit a technical proposal and a commercial proposal 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 technical bid must contain a point-by-point technical compliance document. The technical proposal should contain a compliance table with 5 columns.
 - a. First column must list the technical requirements, in the order that they are given in the technical requirements below.

- b. The second column must provide specification of the instrument against the requirement (please provide quantitative responses wherever possible)
 - c. The third column should describe the compliance with a “YES” or “NO” only. Ensure that the entries in the column 2 and column 3 are consistent.
 - d. The fourth column should clearly state the **reasons/explanations/context** for deviations if any. Without clear explanation, just stating YES” or “NO” will not be considered.
 - e. The fifth column may contain additional remarks. It can be used to highlight the technical features, qualify response of previous columns, or provide additional details.
3. 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.
 4. If multiple systems can fulfil the requirements, vendors can submit multiple bids.
 5. The commercial bid must include the price of the item 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.
 6. As an option, please provide itemized cost for any suggested accessories/add-ons that may enhance the usability, capability, accuracy, or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
 7. Provide itemized cost for required spares for 3 years of operation. For sake of calculation the vendor may assume the active instrument usage of 35 hours/week. The system will remain powered on continuously. This number will be used to estimate the lifecycle cost of the instrument.
 8. 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.
 9. 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.
 10. **The quotations should be on FOR-IISc Bangalore basis. Please quote the price of each optional line item, separately.**

The deadline for submission of the bids is **06 September 2021, 5:00 pm Indian Standard Time**. Direct all questions concerning the acquisition to addresses to Dr. Anoop Thomas at: athomas@iisc.ac.in

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 50 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 Fourier Transform Infrared (FT-IR) spectrophotometer with variable angle reflectance measurement capability.

1. Optics:

- a) The optical bench should be sealed and desiccated and purgeable with inert gas.
- b) An internal attenuator wheel with minimum 4 positions must be available to prevent the saturation of detectors.
- c) There should be a provision for an additional transmittance channel allowing for MIR transmittance measurements independent from the spectrometers main sample compartment.
- d) The FT-IR should have at least 2 input and output beam ports for upgrade.

2. Spectral range: 100 cm⁻¹ to 6000 cm⁻¹ using a single source, single beam splitter and single detector.

The spectrometer should be upgradable to analyze samples in the far-IR (up to 20 cm⁻¹) and NIR (up to 26000 cm⁻¹) region without increasing the footprint of the spectrometer.

3. **Spectral resolution:** Should be better than 0.4 cm⁻¹ under standard mid infrared (MIR) measurement conditions using KBr beamsplitter.
4. **Signal to noise ratio:** 50,000:1 peak to peak in 60 seconds and 13000:1 peak to peak in 5 seconds scan or better.
5. **Wavenumber accuracy:** Better than 0.01 cm⁻¹ at 1500 cm⁻¹
6. **Photometric accuracy:** Better than 0.1% in transmission mode
7. **Light sources required:** (1) Mid-IR and (2) NIR source. The light source must be air cooled and electronically stabilized for highest precision and long lifetime. Software controlled interchange of sources should be possible.
8. **Detectors:** The following MIR detectors are needed,
 - a) Deuterated triglycine sulfate (DTGS) detector with high sensitivity in the spectral range of 100 cm⁻¹ to 6000 cm⁻¹.
 - b) Broad band mercury cadmium telluride (MCT) detector in the spectral range of 450 cm⁻¹ to 7000 cm⁻¹.
 - c) Software controlled interchange of detectors should be possible.
9. **Beamsplitter:**
 - a) The beam splitter should be non-hygroscopic and should support spectral acquisition in the range of 9000 cm⁻¹ to 100 cm⁻¹
 - b) Additional Glass beamsplitter for alignment.

Changing the beam splitters should be straight forward and there should be dedicated sections, preferably in the optics bench of the spectrometer to keep the unused beamsplitters.

10. **Interferometer:** Permanently aligned, wear-free and stable interferometer with velocities ranging from 1.6 - 80 kHz for the movable mirror. Interferometer types creating abrasion or dust (graphite or ball bearings) are not acceptable since they will get stuck and/or misalign over time.
11. **Measurement modes:** Transmission, reflection, absorption, and emission. Software controlled repeated scans should be possible. The basic spectrometer should also allow for time resolved measurements with a rate of at least 15 spectra/second at 8 cm^{-1} spectral resolution.
12. **Sample chamber and transmission measurement platform:** Transmission platform must be suitable for using solid pellets and liquid IR cells from *Specac*. It should also have the following features:
 - a) The transmission sample holder should be compatible with the demountable and heatable liquid cells and the variable temperature measurement accessory from third party providers such as *Specac* (accessories with part Nos. GS21525, GS20582, GS20592 and GS20730) and *Harrick*.
 - b) An additional optical bread board (with metric scale mounting holes) that fits inside the sample compartment.
 - c) All the transmission platforms should be automatically recognized by the instrument upon connection.
13. **Reflectance measurement:** The spectrometer must have a specular reflectance measurement capability with the following technical features.
 - a) **Reflectance mode should support 15° to 80° variable angle specular reflectance measurement.**
 - b) Manual and computer assisted angle adjustment should be possible.
 - c) **The sample platform should contain a demountable solid sample holder and a holder for the mid-IR polarizer with automatic rotator.**
 - d) A mid-IR polarizer is required.
 - e) Other available variable or fixed angle specular reflectance measurement accessory in the range of 0 - 15° may be quoted as optional accessories.
14. **IR emission measurement:** The spectrometer should be equipped for IR emission studies. The main requirements are:
 - a) **An input port** for the emitted light from the sample placed outside the spectrometer (ideally on the right side) to enter to the spectrometer.
 - b) **The mirrors suitably aligned** with the optical bench such that the emitted light from the sample placed outside the spectrometer is directed towards the interferometer and to the optical bench of the spectrometer for detection.
 - c) IR emission sample housing and the blackbody source could be quoted as optional accessories.

15. **Interface and software:** The full process of data acquisition, data processing, data evaluation and data visualization/reporting must be manageable by single workstation software appropriately interfaced to a PC using Windows Operating system. The data acquisition software should be included for all the measurement modes. A library of common polymers and solvents must be included.

A branded computer with latest hardware configuration and all the required accessories should be included.

16. **Electrical connectivity and UPS:** The instrument and all the accessories should be operational based on Indian standard electrical connectivity. Suitable UPS (at least 30 minutes power backup) be given as an optional item with a separate quote.

17. **Accessories:** Must include basic accessories, such as KBr pellet holder and liquid cell.

18. **Purging unit:** A Liquid Nitrogen Cryocan (2 Nos) with at least 55L capacity to generate dry nitrogen by evaporation and compatible tubing to connect the spectrometer.

19. **Warranty:** A minimum of 2 (two) years warranty is required. Annual Maintenance Contract (AMC) for additional 3 (three) years must be included. (Quote separately).

20. **Upgrade possibility:** The spectrometer should be capable of upgrading with other accessories such as IR-microscope and Far-IR measurement setup.

21. **Installation and training:** Installation and training should be provided at the customer site. Installation requirement should be intimated in advance.

22. **Optional items to be included, with a separate quote.**

a) Far-IR source ($450 - 20 \text{ cm}^{-1}$)

b) Far-IR detector

c) Far-IR beam splitter.

d) Variable or fixed angle specular reflectance accessories in the range of $0^\circ - 15^\circ$.

e) Electrically Heated Jacket with temperature controller (230V) and cooling unit for temperature-controlled liquid sample measurement.

f) IR emission sample housing and blackbody source.

g) Diamond ATR measurement accessory.

h) ATR accessory that can be used along with the variable angle specular reflectance measurement unit including a ZnSe and CaF_2 hemispheres and prisms.