



भारतीय प्रौद्योगिकी संस्थान गाँधीनगर

विश्वकर्मा शासकीय अभियांत्रिकी महाविद्यालय परिसर,
चाँदखेडा, अहमदाबाद, गुजरात - 382 424

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

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IIT
GN

Date: 24th January, 2012

Tender No.: IITGN/ADVT/2011-12/01

Last date: 20th February, 2012 on/before 04:00PM

SUB: Invitation of sealed tender for supply and commissioning of Laboratory Equipments, as per specifications shown in the attached Annexures I-V.

Dear Sir,

Indian Institute of Technology Gandhinagar invites sealed tender for Laboratory Equipments, as per specifications shown in the attached Annexures I-V on the following terms & conditions:

1. If the supplier/firm is manufacturer/authorized dealer/sole distributor of any item, the Certificate to this effect should be attached.
2. The tender documents are to be in two parts as **Technical Offer and as Financial offer**:
 - a.) The Technical offer should include the detailed specifications of main equipment/item and its accessories. All items should be numbered as numbered for each instrument in the Annexures I-V.
 - b.) The financial offer should include the cost of main equipment/item and its accessories numbered as in (a). If there is any separate cost for installation etc. that should be quoted separately. The total cost should be quoted in words as well as figures (typed or printed). Amendment should be avoided. Amendments, if any, should be duly initialed, failing which the offers are liable to be rejected.
 - c.) The two parts of the offer should be placed in separate sealed envelopes clearly marked "**Technical Offer**" & "**Financial Offer**". These two envelopes must be enclosed in one bigger envelope duly sealed and super scribed with tender number, name of the instrument and tender due date must be forwarded to the undersigned so as to reach him on or before the due date.
 - d.) If a supplier/firm wishes to submit offers for more than one instrument, the offer for each individual instrument as indicated in the attached Annexures I-V should be submitted separately following the procedure outlined above in points (a) to (c).

Incomplete tenders, amendments and additions to tender after opening or late tenders are liable to be ignored and rejected.

3. Fax and Email quotation are not acceptable.

4. Quotations should be valid for 120 days from the tender due date. The quotation should clearly indicate the period of delivery, warranty terms etc. A minimum of one year warranty is required from the date of commissioning.

5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. The Suppliers should submit copies of suitable documents in support of their reputation, credentials and past performance.

6. The quotations should be given for the items in the same order as in the tender document.

7. Imported supplies should be delivered by air and quoted for CIP Ahmedabad.

8. The quantity shown against each item is approximate and may vary as per demand of the Institute at the time of placing order.

9. In case of payment through Letter of Credit (LC), ninety percent of the payment will be released after completion of the supply. The balance 10% of the payment will be released after satisfactory installation of the equipment.

10. IIT Gandhinagar is exempt from payment of Excise Duty and is eligible for concessional rate of Custom Duty. Necessary certificate will be issued on demand. IIT Gandhinagar will make necessary arrangements for the clearance of imported goods at the Airport. Hence, the price should not include these charges.

11. In the event of any dispute or difference(s) between the vendee IIT Gandhinagar and the vendor(s) arising out of non-supply of material or supplies not found according to the specifications or any other cause whatsoever relating to the supply or purchase order before or after the supply has been executed, shall be referred to the concerned authority of IIT Gandhinagar who may decide the matter himself or may appoint arbitrator(s) under the arbitration and conciliation Act 1996. The decision of the arbitrator shall be final and binding on both the parties.

12. The place of arbitration and the language to be used in arbitral proceedings shall be decided by the arbitrator.

13. All disputes shall be subject to Gandhinagar Jurisdiction only.

14. I.I.T. Gandhinagar has the right to accept the whole or any parts of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

15. The Tender opening date & time will be communicated to the suppliers through an email. Information in this regard will also be posted on Institute's web site / Notice board.

a.) The suppliers or their authorized representative may also be present during the opening of the Technical offer, if they desire so, at their own expenses.

- b) Only those financial offers will be opened whose technical offers are found suitable by the expert committee appointed for the concerned instrument..
- c) No separate information shall be given to individual bidders. In incomparable situation, the committee may negotiate price with the qualified bidder quoting the lowest price before awarding the offer.

16. In case the supplier requires any elucidation regarding the tender documents, they are requested to contact to the Assistant Registrar (M.M.) through e-mail, purchase@iitgn.ac.in on or before 20/02/2012.

17. A Demand draft of Rs. 1,000/- (Rupees One Thousand only) from a Nationalized bank towards non-refundable tender fee drawn in favour of "IIT Gandhinagar" payable at Ahmedabad should accompany the Technical bid document.

18. A refundable amount @ 2% of the quoted price as earnest money deposit (EMD) in the shape of DD from Nationalized bank drawn in favour of "IIT Gandhinagar" payable at Ahmedabad should accompany the financial bid documents. Without the EMD the bid will not be considered. The EMD should be valid for 180 days.

The EMD of the successful bidder will be returned to them without any interest after completing the successful installation. The earnest money of unsuccessful bidders will be returned to them without any interest within fifteen working days after awarding the offer.

19. All tender documents should have to be forwarded through speed post or registered post, courier to the following address so as to reach the following address on/before 04:00PM, 20th February, 2012.

Assistant Registrar (M.M.)
Indian Institute of Technology Gandhinagar,
Vishwakarma Government Engineering College Campus,
Ground Floor, Block " A " ,
Visat-Gandhinagar Highway, Chandkheda
Ahmedabad 382424
Tele/ Fax No. +91 79 2397 2583

Other Terms & Conditions:

1. Pre – Qualification Criteria:

a. Bidders should be the manufacturer / authorized dealer. Letter of Authorization from Manufacturer on the same and specific to the tender should be enclosed.

b. An undertaking from the original Manufacturer is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.

2. Performance Guarantee Bond:

- a. Performance Guarantee Bond is mandatory.
- b. Successful supplier/ firm should submit performance guarantee as prescribed and to be received in the office of Assistant Registrar, Materials Management Division before the date of commencement of supply or 30 days from the date of acceptance to tender, whichever is earlier. The performance guarantee bond to be furnished in the form of Bank Guarantee as per given proforma of the tender documents, for an amount covering 10% of the value of quantity of material on landed cost basis.
- c. The Performance Guarantee Should be established in favour of “ IIT Gandhinagar” through any Nationalized Bank Situated at Ahmedabad/Gandhinagar with a clause to enforce the same on their local branch at Ahmedabad.
- d. Validity of the performance guarantee bond shall be for a period of five years from the date of issue of installation & commissioning.

2. **Delivery:** The Equipment should be delivered and installed within the period as specified in the purchase order and be ready for use within one week of delivery unless otherwise prescribed.

3. **Penalty:** If the suppliers fails to deliver and place any or all the Equipment or perform the service by the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted.

4. **Training:** Suppliers need to provide adequate training at IIT Gandhinagar to the nominated person of IIT Gandhinagar at their cost. IIT Gandhinagar will not bear any training or leaving expenditure in this regard.

5. **Installation & Warranty Declaration:** Suppliers must give the comprehensive onsite warranty as required from the date of successful installation of Equipment against any manufacturing defects. In the installation report the model number of instrument and all spares parts numbers should be in the line of purchase order. And suppliers must be written in the warranty declaration that “everything to be supplied by us hereunder shall be free from all defects and faults in material, workmanship and shall be of the highest quality and material of the type ordered, shall be in full conformity with the specification and shall be complete enough to carry out the experiments, as specified in the tender document.”

Any deviation in the material and the specifications from the accepted terms may liable to be rejected and the suppliers need to supply all the goods in the specified form to the satisfaction / specifications specified in the Purchase order and demonstrate at the their own cost.

Sd/-

Assistant Registrar (M.M)

PARTICULARS TO BE FILLED BY THE SUPPLIER

1. Name of the Supplier:
2. Complete Address of the Supplier:
3. Availability for demonstration of instruments at IIT Gandhinagar: Yes / No [Please ✓]
4. Cost of the Tender enclosed: Yes/No [Please ✓] If yes,
 - a.) Name of the Bank_____
 - b.) Amount (₹)_____
 - c.) Demand Draft No. _____
5. Earnest Money Deposit enclosed: Yes / No [Please ✓] if Yes,
 - a.) Name of the Bank_____
 - b.) Amount (₹) _____
 - c.) Demand Draft No. _____
 - d.) Last Validity date of the enclosed DD _____
6. Communication details of the concerned contact person to whom all references shall be made regarding this tender enquiry. [NOTE: Any changes after submission of Tender documents kindly update IIT Gandhinagar]
 - a.) Full Name :
 - b.) Complete Postal Address:
 - c.) Telephone No.:
 - d.) Fax No.:
 - e.) Mobile No.:
 - f.) E-mail:
 - g.) Website Address:

PARTICULARS FOR PERFORMANCE GUARANTEE BOND

(To be typed on Non-judicial stamp paper of the value of Indian Rupees of Two Hundred) (TO BE ESTABLISHED THROUGH ANY OF THE NATIONALISED BANKS (WHETHER SITUATED AT AHMEDABAD OR OUTSTATION) WITH A CLAUSE TO ENFORCE THE SAME ON THEIR LOCAL BRANCH AT AHMEDABAD. BONDS ISSUED BY CO-OPERATIVE BANKS ARE NOT ACCEPTED.)

To,
The Asst. Registrar,
Indian Institute of Technology,
VGEC Campus, Ahmedabad – 382424

LETTER OF GUARANTEE

WHEREAS Indian Institute of Technology Gandhinagar (Buyer) have invited Tenders vide Tender No..... Dt. for purchase of AND WHEREAS the said tender document requires the supplier/firm (seller) whose tender is accepted for the supply of instrument / machinery,etc. in response thereto shall establish an irrevocable Performance Guarantee Bond in favour of **“Indian Institute of Technology Gandhinagar”** in the form of Bank Guarantee for Rs [10% (ten percent) of the purchase value] which will be valid for five years from the date of installation & commissioning, the said Performance Guarantee Bond is to be submitted within 30 (Thirty) days from the date of Acceptance of the tender.

NOW THIS BANK HEREBY GUARANTEES that in the event of the said supplier/firm (seller) failing to abide by any of the conditions referred to in tender document / purchase order / performance of the instrument / machinery, etc. this Bank shall pay to Indian Institute of Technology Gandhinagar on demand and without protest or demur Rs (Rupees.....).

This Bank further agrees that the decision of Indian Institute of Technology Gandhinagar (Buyer) as to whether the said supplier/firm (Seller) has committed a breach of any of the conditions referred in tender document / purchase order shall be final and binding.

We, (name of the Bank & branch) hereby further agree that the Guarantee herein contained shall not be affected by any change in the constitution of the supplier/firm (Seller) and/ or Indian Institute of Technology Gandhinagar (Buyer).

Notwithstanding anything contained herein:

a. Our liability under this Bank Guarantee shall not exceed Rs. (Indian Rupees only).

b. This Bank Guarantee shall be valid up to(date) and

c. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if IIT Gandhinagar serve upon us a written claim or demand on or before(date).

This Bank further agrees that the claims if any, against this Bank Guarantee shall be enforceable at our branch office at situated at

.....

(Address of local branch).

Yours truly,

Signature and seal of the guarantor:

Name of the Bank:

Complete Postal Address:

Date:

ANNEXURE-I

Name of the Equipment: X-Ray diffraction System

Floor mounted fully automatic XRD system must be completed in all respect so that the system is suitable to work in both Bragg-Brentano and Parallel Beam Geometry. The change over from Bragg-Brentano to Parallel beam geometry and vice versa must be fully user friendly and minimal interference of operator.

X-ray diffractometer with following specification:

A. For powder XRD (Bragg-Brentano Geometry)

a. X-ray generator and tube

- i. Microprocessor controlled sealed tube X-ray generator of 3.0 kW with high stability of better than $\leq 0.01\%$ per at 1% variation of mains.
- ii. Ceramic insulated Cu tube
- iii. Maximum Voltage 20- 60 KV or better
- iv. Maximum Current 5 to ~ 60 mA or better
- v. Voltage step: min 1kV
- vi. Current step: min 1mA

b. Goniometer

- i. High resolution automated direct optical position or stepper motor controlled Goniometer
- ii. Type vertical, θ - θ band with independent θ & 2θ drive automatic control
- iii. Scanning Range: 2θ from 0.5° to 140° or better.
- iv. Minimum Step size - 0.001° or better.
- v. Goniometer Reproducibility: 0.0001

c. Detector

High speed solid state array area detector

- i. Minimum global count rate should be more than 50 million CPS or more so that it can be used for fast high resolution powder diffraction, structure refinement and stress and texture measurements.
- ii. Low dark noise over whole detector.
- iii. The detector must be operable in 1- Dimensional as well as 0-Dimensional mode.
- iv. Reflected beam secondary monochromator to be provided to suppress sample fluorescence.

d. Optics

Necessary divergence, Antiscatter and soller slits along with receiving slits should be part of the basic system. Different optical geometries including primary, secondary and sample stages should be easily exchangeable by the user with minimum requirement of alignment.

e. Sample stage

- i. Two types of sample stage should be provided. One flat sample stage and another Reflection cum Transmission Spinning Sample Stage. This Spinning stage should be able to take samples between foils for measurement of samples in transmission geometry. This should be part of basic unit.
- ii. Rotational sample stage (sample spinner) with facility to control the rotation through software.

f. Electronics

The system electronics should have an integrated shutter control and be capable of monitoring and controlling all diffractometer functions such as angles, counts, slits, generator safety, etc.

g. Computer and printer

- i. Desktop computer for all operations of the XRD with minimum Pentium Dual Core 2 or higher processor, DVD-RW drive facility, >500GB HDD, >8GB DDR RAM, 19" LCD Monitor, Minimum 4 USB ports, Windows 7 operating system. A color desk-jet printer should be provided.
- ii. If any other hardware is required for connecting the computer to the instrument, the same should also be provided.

h. Software

- i. General - The software should be capable of simultaneous diffractometer control, data collection and analysis, peak search, search-match, profile fitting and elaborate pattern treatment such as data smoothening, background subtraction, $k\alpha_2$ stripping, etc.
- ii. Search match software should be provided.
- iii. Crystallographic Software – Rietveld based quantitative phase analysis software. The software should be able to have different algorithms for Monoclinic and Triclinic crystal structures. Software should be able to determine lattice parameters. Further functions to be covered are as below:
 1. Qualitative analysis
 2. Phase quantification by RIR method
 3. Peak/Line Profile analysis
 4. Lattice parameter determination
 5. Crystallite size determination
 6. Percentage Crystallinity Determination
 7. Phase quantification based on Rietveld method
 8. Unit Cell determination
 9. Space Group Determination
 10. Electron density Fourier Mapping
 11. Different methods of search for cells should be available.
 12. Le Bail fit for refinement of unit cell dimensions, sample height, preferred orientation and relative peak intensities.
 13. Ab-initio Structure Determination Method
 14. Systematic non parametric analysis patterns through cross co-relation method.
 15. Compatibility of the software to access publicly available open source crystallographic database (COD)
- iv. Standard crystallographic ICDD database for phase identification

v. All software should be provided with ≥ 10 user licenses. The software should be able to be loaded on different PC's including laptops at any point of time without connecting to LAN.

vi. All software should be original licensed version and should be provided with individual catalogue no. Software should have facility for remote diagnostics and remote operation of the instrument.

i. Calibration Standard

NIST standard sample for calibration of instrument must be provided with the XRD system.

B. For thin film analysis (Parallel Beam optics)

a. System should have possibility to changeover from Bragg-Brentano Geometry to Parallel Beam Geometry without any need of re-alignment.

b. Suitable parallel plate collimator to be provided.

c. Suitable software for grazing incidence studies to be offered.

d. Necessary Multilayer Mirror, sample stage and solar slits must be quoted for Grazing Incidence thin film analysis and parallel beam studies.

e. Standard sample for calibration.

C. For small angle X-ray scattering (SAXS)

a. Necessary Multilayer Mirror, Capillary sample stage for analysis of liquid slurries and suspended particles, primary secondary & solar slits, data collection and data interpretation software (such as size, shape of particles, pore distribution etc.) for SAXS studies must be quoted.

b. Suitable Transmission stage and suitable sample holder etc.,

c. Suitable reference sample should be provided for on-site demonstration and calibration.

D. For non-ambient High Temperature (HT) analysis

a. High Temperature Attachment up to 1600°C including all accessories like control unit with temperature and gas flow controller, vacuum systems, connecting hoses, accessories etc.

b. The HT attachment should be with environmental heating to minimum temperature gradients and accommodate different type of samples (flat or powder samples).

E. Safety

a. Should confirm to highest Indian and International safety standards and regulations pertaining to X-ray Radiation and other hazards. Vendor to provide certificate stating the radiation dosage for the quoted model.

F. Accessories for power supply and water circulation

a. The vendor should quote for an Indian make chiller of adequate capacity for the XRD.

b. Suitable UPS to run XRD and Chiller for at least 30 minute backup (>20 kVA) must be quoted optionally along with any other requirements.

G. Warranty

The complete instrument and chiller excluding consumables should be under warranty for a period of one year from the date of installation. Extended warranty is preferable. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts. But it should be repaired within 72 working hours from the date and time of complaint lodged by the user. The supplier should provide all spares required for making the instrument operational.

All the warranty replacement part should be dispatch on DDP (free domicile) at site. IIT will return defective parts after replacement.

AMC: Please also mention the financial involvement for two years on site Annual Maintenance after normal Warranty.

H. Reinstallation

IIT Gandhinagar is presently situated in its temporary campus (VGEC campus, Chandkheda, Ahmedabad). This instrument is expected to be relocated to a permanent campus. So a onetime relocation costs (within or outside warranty period) should be quoted separately.

I. Maintenance

Service problems should be attended within 72 working hours of the problem reporting. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts.

J. Installation and training:

Installation should be done by the manufacturer and on-site application training must be given to the users free of cost.

K. User list with contacts

Vendor should provide us a list of installations in India with all contact details and model details and modules available so that IIT Gandhinagar can approach the contact person for any feedback.

L. Spares

a. The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the installation of the instrument.

b. One set of operating manual and service manual (in English) should be provided with the instrument.

ANNEXURE-II

Name of the Equipment: Ambient Scanning Probe Microscope

Ambient Scanning Probe Microscope (AFM/STM) with following specifications:

Specifications:

1. Multimode AFM options (Contact, Non-contact, lateral, magnetic and electric force, phase imaging)
2. Option for STM/STS.
3. Option for simultaneous imaging of topography and conductivity profile in both the contact and non-contact mode AFM.
4. This instrument should have option for field upgradeability to include nanolithography, nanoindentation, Piezo force microscope and electrochemical AFM.
5. Scanner options in the AFM mode:
 - i) approximately 100 μm x 100 μm
 - ii) approximately 1 μm x 1 μm or less
6. Instrument should perform demonstrable sub-nanometer (atomic resolution) in air in the standard AFM/STM mode.
7. Instrument should perform automatic image optimization of all imaging parameters including set-point, feedback gains, scan rates and Z limit in both the air and liquid environment in the standard AFM/STM mode.
8. Requisite hardware and software for all the modes mentioned in items (1)-(3).
9. The instrument should have the capability to measure tunneling current in the range of sub-pico-ampere in the low current STM mode.

10. For simultaneous imaging of topography and conductivity profile measurement, the Instrument should have the ability to measure low currents of approximately 50 femto-amp or less in both the contact and non-contact modes.
11. Vibration isolation and acoustic enclosure (noise level should be less than 0.3 A⁰ in Z-axis)
12. Quantitative phase imaging with enhanced image contrast and frequency detection.
13. System should include a real time optical viewing option, magnification above 450X.
14. Possibility of freedom to design novel SPM experiments.
15. **Computer and printer:**
 - i. Desktop computer for all operations of the AFM with minimum Pentium Dual Core 2 or higher processor, DVD-RW drive facility, >500GB HDD, >8GB DDR RAM, 30" LCD Monitor, Minimum 4 USB ports, Windows 7 operating system. A color desk-jet printer should be provided.
 - ii. If any other hardware is required for connecting the computer to the instrument, the same should also be provided.

Accessories for vibration isolation table and power supply:

1. The vendor should quote for dry air (Nitrogen cylinder or Compressed air from compressor/cylinder) for vibration isolation table for the AFM. Necessary UPS (3 KVA, 1 hour backup) to run AFM and Nitrogen/compressed air cylinder must be quoted optionally along with any other requirements.

Terms and conditions:

1. Warranty:

The complete instrument and accessories excluding consumables should be under warranty for a period of three years from the date of installation. Extended warranty is preferable. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts. But it should be repaired within 72 working hours from the date and time of complaint lodged by the user. The supplier should provide all spares required for making the instrument operational.

All the warranty replacement part should be dispatch on DDP (free domicile) at site. IIT will return defective parts after replacement.

AMC: Please also mention the financial involvement for two years on site Annual Maintenance after normal Warranty.

2. Reinstallation

IIT Gandhinagar is presently situated in its temporary campus (VGEC campus, Chandkheda, Ahmedabad). This instrument is expected to be relocated to a permanent campus. So a onetime relocation costs (within or outside warranty period) should be quoted separately.

3. Maintenance

Service problems should be attended within 72 working hours of the problem reporting. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts.

4. Installation and training:

Installation should be done by the manufacturer and on-site application training must be given to the users free of cost.

5. User list with contacts

Vendor should provide us a list of installations in India with all contact details and model details and modules available so that IIT Gandhinagar can approach the contact person for any feedback.

6. Spares:

The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the installation of the instrument.

7. Manual:

One set of operating manual and service manual (in English) should be provided with the instrument.

8. Demonstration and standards:

Appropriate test gratings must be provided for x-y and z calibration in all ranges and appropriate Specifications for optimum performance should be clearly mentioned. Specifications quoted should be demonstrable on site at the time of installation. Standard specimens for all modes must be supplied.

Quote must have a compliance report on all the above points.

ANNEXURE-III

Name of the Equipment: 500 MHz Nuclear Magnetic Resonance Spectrometer

1. General Specifications for Fourier transform Nuclear Magnetic Resonance (FT-NMR) Spectrometer at 500 MHz with active/ ultra shield plus superconducting magnet at 11.74 Tesla

- a) 2-channel NMR
- b) Liquid Helium Hold time of Magnet >365 days
- c) 54mm room temperature bore
- d) Radial stray 5G field <0.7 ma and axial <1.3m
- e) At least 8 cryoshims.
- f) Magnet leg anti-vibration pads to damp >5 Hz
- g) Please specify minimum ceiling height for housing the magnet (preferably less than 3.5m)
- h) Liquid Helium and Liquid Nitrogen transfer line
- i) Helium and Nitrogen level measuring kit
- j) Liquid Nitrogen refilling kit
- k) At least 30 shims needed
- l) <8/15 Hz 1H line shape on non-spinning chloroform sample
- m) Broadband observe probe ^{15}N to ^{31}P with facility for $^1\text{H}\{^{19}\text{F}\}$ and vice versa
- n) One Quadruple nucleic Probe ^1H , ^{13}C , ^{31}P and $^{15}\text{N}/^{19}\text{F}$.
- o) Autosampler (64 sample injector)
- p) One Inverse Probe for higher sensitivity of ^1H experiments
- q) Including z gradient coil and compact automatic tuning and matching setup
- r) Electronics for gradient enhanced experiments max 50G/cm
- s) Module for performing gradient 2H shimming
- t) Variable field/frequency 2H lock operation at selectable fixed fields
- u) Digital quadrature receiver
- v) Acquisition system with DDS, providing <0.01 Hz phase resolution and <0.005 Hz frequency resolution
- w) >8 Mbyte wave form memory
- x) Timing control with 80MHz master clock, phase, frequency, amplitude switching (serially or simultaneously) in less than 30 ns

- y) Digital receive with digital filter and over sampling, digital filtering up to 5MHz bandwidth, lock receiver with facility for automatic removal of quad-images and dc artifacts.
- z) One hardware platform for HR, solids and micro imaging. Confirm if the NMR is capable of up-gradation to cryo/ chill probes at a later date
- aa) Transmitter system with transmitter power more than 80W pulse power for 1H/19F and 250 W for multinuclear work (6- 365 MHz)
- bb) Preamplifier system with preamplifiers for 1H, 2H broadband
- cc) Variable temperature operation from -150°C to +150°C

2. Computer/ Software Requirements

- a) PC controlled, with Windows operating system, with software for 1D, 2D and 3D acquisition and processing.
 - i. Two Desktop computers, one for data processing and another for operation of NMR instrument with minimum Pentium Dual Core 2 or higher processor, DVD-RW drive facility, >500GB HDD, >8GB DDR RAM, LCD Monitor, Minimum 4 USB ports, Windows 7 operating system must be provided
 - ii. If any other hardware is required for connecting the computer to the instrument, the same should also be provided.
- b) One additional software license for data processing from Satellite Workstation.
- c) Printer: Suitable laser printer must be quoted.

3. Liquid Helium for Installation of the magnet and Annual Refilling for maintenance: It is the responsibility of the vendor to procure liquid Helium required for installation of the magnet and it is the responsibility of the vendor to procure and replenish/refill the liquid Helium necessary for maintaining the super-cooled temperature surrounding the magnet for a period of five years.

4. Accessories

- a) Quote for items supplied from local sources such as UPS with one-hour backup, Liquid N₂ Dewars (4 numbers of 200 Liter Capacity), Air-compressor and Drier. Air-compressor should have capacity for both liquids and solids. These items, while available locally, must be supplied along with the instrument.
- b) Consumables including 100 NMR sample tubes with caps as well as necessary solvents for installation.
- c) Any other necessary accessory must be quoted.

5. Optional Items

- ❖ 4mm CPMAS (solids) accessory with sample ejection from top of magnet

6. Warranty: The complete instrument and accessories excluding consumables should be under warranty for a period of 4 years from the date of installation.

7. Service: Service problems should be attended within 72 working hours of the problem reporting. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts.

8. Reinstallation: IIT Gandhinagar is presently situated in its temporary campus (VGEC campus, Chandkheda, Ahmedabad). This instrument is expected to be relocated to a permanent campus. So a onetime relocation costs (within or outside warranty period) should be quoted separately.

9. Maintenance

Service problems should be attended within 72 working hours of the problem reporting. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts.

10. Delivery Time: Specify delivery time for the machine from the date of opening of LC.

11. Installation and training: Installation should be done by the manufacturer and on-site application training must be given to the users free of cost.

12. User list with contacts: Vendor should provide us a list of recent installations of the quoted model in India with all contact details and model details and modules available so that IIT Gandhinagar can approach the contact person for any feedback

13. Quote must have a compliance report on all the above points. A detailed specification sheet highlighting all above specification along with detailed experimental conditions must be attached

14. Operation and Service manuals (in English) should be provided.

ANNEXURE-IV

Name of the Equipment: Field Emission Gun-Scanning Electron Microscope (FEG-SEM) with Energy Dispersive Spectroscopy (EDS)

I. SEM

1. Resolution (HV mode and LV mode)

- a. HV mode: 1.0 nm at 15kV and
- b. LV mode: 1.5 nm at 1 kV using beam deceleration / Gentle Beam mode

2. Probe current:

100 nA or better.

3. Magnification:

X25 to X 1, 000,000

4. Accelerating voltage:

100V - 30 KV

5. Electron gun/ source

Thermal (Schottky) Field Emission Gun.

6. Auto functions

Automatic focus, Automatic stigmator, Automatic contrast and brightness (ACB)

7. Specimen stage

- a. At least 3 axis motorized stage with X-Y 50 mm, Z 25 mm or better
- b. Motorized Eucentric Stage

8. Specimen chamber

Should accept sample size of at least 100 mm diameter through airlock.

9. Specimen holder

Multi specimen holder should be supplied in addition to standard specimen holder

10. Specimen air lock

- a. FESEM should include an air lock system for specimen exchange without the need to open the specimen chamber.
- b. It should be possible to introduce at least 100 mm diameter sample to the airlock.

11. Cold trap

FE SEM should have LN₂ cold trap as a standard to prevent contamination ensuring high resolution imaging

12. Imaging lens system

- a. High resolution objective lens.
- b. The system should include special filters to filter SE and BSE signals.

13. Imaging and processing

Secondary and backscattered electron imaging with various image enhancements & processing controls, pseudo coloring facility image storage in JPEG/TIFF or any other compatible format suitable for image analysis.

14. Vacuum.

- a. Should be fast clean and contamination free
- b. Electron gun chamber vacuum: $\sim 10^{-7}$ Pa or better
- c. Chamber vacuum: 10^{-4} Pa or better

15. Power: 230 V AC, 50/60 Hz

16. Pumping system: Fully automatic pumping system.

17. Detectors

- a. Two in-lens secondary electron detectors
- b. One BSE detector in lens/column for obtaining low and high angle BSE signal and low and high energy
- c. Energy dispersive X-ray detector (specifications given separately)
- d. Filter: variable energy filtration of secondary and backscattered electron (ExB or r filter or equivalent)

II. EDS Detector

1. Model: LN₂ free SDD Detector based EDS System

2. Detector: Liquid N₂ free SDD type

3. DD crystal area: 50 mm² minimum

4. Sensing capability: Has capability of sensing Beryllium onwards

5. Energy resolution: Resolution 132 eV or better

6. Shift: <1eV shift in peak position

7. Resolution: 1000cps to 1, 00,000 cps

8. Software:

- a) Software should be capable of:
 - a1. Elemental Analysis;
 - a2. Spectral (Hyper) Mapping;
 - a3. Multi-Elemental Mapping;
 - a4. Image Co-related Elemental Analysis;
 - a5. Line and Multi-point Analysis
- b. The software should have a provision to show the X-ray activation sample volume.
- c. Software should have very latest Quantification correction algorithms for accurate quant results.

9. Up gradation

Upgradeable to add WDS / EBSD system at a later date.

III. Accessories

- a. Computer system and Suitable Laser Printer
 - a1. 19 " LCD
 - a2. Ethernet ready
 - a3. Windows Family OS
 - a4. All necessary software
 - a5. Image at 2560x2048 pixels
- b. Necessary Chiller and UPS to be supplied by the vendor
- c. Suitable Sputter coater with accessories should be supplied.

IV. Warranty and Maintenance

- a. The complete instrument and chiller excluding consumables should be under warranty for a period of one year from the date of installation. Extended warranty is preferable.
- b. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts. But it should be repaired within 72 working hours from the date and time of complaint lodged by the user. The supplier should provide all spares required for making the instrument operational.
- c. All the warranty replacement part should be dispatched on DDP (free domicile) at site. IIT will return defective parts after replacement.

d. Annual Maintenance Contract

- d1. At least one year of free service after a normal period
- d2. Please also mention the financial involvement for two years on site Annual Maintenance after normal Warranty and free service period.

V. Installation and training

Installation should be done by the manufacturer and on-site application training must be given to the users free of cost.

VI. Reinstallation

IIT Gandhinagar is presently situated in its temporary campus (VGEC campus, Chandkheda, Ahmedabad). This instrument is expected to be relocated to a permanent campus. So a onetime relocation costs (within or outside warranty period) should be quoted separately.

VII. Spare Parts

The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the installation of the instrument

VIII. Manual

One set of operating manual and service manual (in English) should be provided with the instrument

IX. User List with Contacts:

Vendor should provide us a list of installations in India with all contact details and model details and modules available so that IIT Gandhinagar can approach the contact person for any feedback.

ANNEXURE-V

Name of the Equipment: ESI-Q-ToF Mass Spectrometer

Specifications for a state of art quadrupole time of flight (Q-ToF) high resolution MS system having an ESI/APCI source coupled with LC system and capable of MS and MS/MS operation.

1 Mass Range: (High resolution): Applications predominantly range from small molecules (e.g. molecules having molecular weight in the range of about 100+ molecular weight) to biomolecules (e.g. Protein Characterization): molecules across different molecular range should have similar sensitivities.

2. Scan Types- Molecular Ion scan, MS/MS and any additional scan types to enhance detection and fragmentation of metabolite, modified peptides, lipids etc would be preferred.

3. Interface: Simple interface for maintaining cleanliness of ion optics and capable of handling large batches of complex samples. It should have a low maintenance inter face which should not require frequent cleaning.

4. Acquisition Rate: To identify maximum analytes and generate their MS/MS data for characterization, the system should be able collect at least 25 spectra in MS and 50 spectra in MS/MS in high resolution mode while maintaining the sensitivity, resolution at the speeds mentioned here, it will be the key in maintaining compatibility with Fast LC as well as high resolution LC for both biomolecule and small molecules applications.

5. Resolution: Mass resolution of 25000 (Full Width Half Maximum) over mass range of 195 to 1500 m/z in both MS and MS/MS mode to identify and distinguish peptides/ small molecules. The resolution should be equal or higher than 35000 FWHM for large biomolecules.

6. Mass Accuracy: For unambiguous mass assignment and empirical formula calculations of small and large molecules system should offer external mass accuracy of 2 ppm or better as well as offer less than 0.5 ppm mass accuracy with internal calibration demonstrated in MS/MS fragment ion. Mass accuracy stability with varying ambient temperature must be specified.

7. Sensitivity: High sensitivity for qualitative and quantitative analysis while maintaining high resolution and highest scan speed. Femtomole sensitivity is desirable. State the sensitivity achieved. The signal to noise (S/N) ratios should produce 20:1 or better in MS/MS mode.

8. Vacuum system A fully protected air-cooled vacuum system using turbo molecular pumps and rotary pumps. Vacuum read backs and automated vent system must also be present.

9. Linear Dynamic Range At least four or better orders of linear dynamic range or more for quantitative acquisition.

10. Ion Source: Choice of two ionization sources to cover all areas of applications.

a. Orthogonal Electro Spray ionization (ESI) to cover higher flow HPLC applications compatible with flow rates of 1mL/ min- 2 mL/min or more without splitting the flow;

b. Atmospheric Pressure Chemical Ionization Source (APCI): should be compatible with flow rates up to 2mL/min. And can be attached to reference probe either intra or inter sample during a batch of sample analysis to allow automated calibration and tuning.

The above ion sources should be easily inter-changeable by the user himself. A combined ESI/APCI source will be preferable so that the facility permits switching between the two ionization types during a single LCMS experiment.

11. Direct Infusion: Syringe pump or equivalent for direct infusion of samples.

12. Reference Mass Introduction: The instrument must allow the injection of a calibrate solution automatically in a second stream simultaneously; in parallel with the flow of sample for high mass accuracy with external calibration. The mass accuracy/calibration once done should be maintained for at least 6 hours. Any device/accessory required to achieve the same should be provided with the system.

13. Operating modes: Simultaneous qualitative and quantitative expression, ESI and combined ESI and APCI in single run. The software should be capable of data acquisitions whereby high and low collision energy data is acquired simultaneously to provide fragmentation data for all detectable molecular ions. The instrument should alternate between low and high-energy in the collision cell during chromatographic runs. In the low-energy acquisition it records the mass spectrum exhibiting mainly precursor ions, and in the high-energy acquisition their respective fragment ions.

14. Operating Workstation Specifications: Please quote for two high capacity high-end state of art computer work station for online and offline analysis of large data sets and complex multi threaded applications for collection and storage of large amount of data and high speed database searches and data retrieval.

- a) Processor: Intel Xeon 5500 series processors with highest available clock speed,
- b) Operating System: Windows 7 with downgrade rights to XP (if needed)
- c) Memory: 1 TB hard drive with dual processors installed
- d) Graphics: NIVIDIA quadro 5800 or equivalent
- e) Hard Drives; SATA drive 1.5 TB x 2 (internal drives)
- f) I/O ports: Standard USB, serial, parallel Ports
- g) Software: MS Office 2007 and other required software
- h) Monitor: High resolution TFT/LCD color monitor (22 inches or higher)
- i) Printer: Suitable laser printer must be quoted

15. Software Specifications:

Software must be able to do automated tuning and calibrations and should have an inbuilt fragmentation interpretation capability. The software should support completely automated quantitative data processing and reporting capabilities, such as Spectrum Review and Processing; Chromatogram Review and Processing; LC Quantization for chromatographic analysis; 3-D Contour plotting; Spectral library search facilities (user defined or commercial libraries); Software should be compatible with window latest OS or latest platform: The genuine copy of required software should be included with upgrade package for future.

The software should have capabilities to perform the following functions.

Automatic library searching against user defined libraries; Accurate Mass library scoring to verify composition of significant ions; Automated MS to MS/MS during a single run with user selectable criteria.; Software for empirical formula calculation; Software which can match Isotopic pattern.; Software for Structural Elucidation must be quoted. Software should be able to control ELSD/FLR and PDA/UV Detector

16. Gas Generator and UPS: Nitrogen gas generation, compressor, gas cylinders (e.g. Argon/N₂) etc should be quoted along with the system. The offer must be complete in itself. Also quote 10 KVA UPS with 60 min battery backup. This UPS must be supplied along with the order of the instrument.

17. Ultra fast LC SYSTEM

Fast LC system should be capable of analytical operation must be included with the MS. The Fast LC System must include:

- a) Quaternary gradient ultra performance pump with inline Degasser with ultra performance pumps with 15000 or better psi pressure range.
- b) Mention Total Flow rate: Desirable Range: 0.01 to 2 ml/min, in 0.001 mL increment.
- c) Autoleak detection and system run facility controlled by software.
- d) Autosampler with pressure tolerance range 15000 psi or better.

- e) Auto sampler should be able to hold vial of 1.0 to 4.0 ml capacity with well ranging from 96 to 384. Additional fifty sample vials of different capacity should be provided along with sample tray.
- f) Total system (including pump & Auto-sampler) should be capable of operation at 15,000 psi.
- g) Flow through needle washing mechanism to avoid carry over. Carry over should be < 0.005% for caffeine compound.
- h) Sample injection volume range 0.1 to 500uL with total and variable injection facility. Required loops and needles to be quoted.
- i) **Column Oven:** Column Oven length (mention range in cm) and Column Oven with temperature range +/- 10°C of room temperature to 80°C.
- j) **Detector:** PDA detector with minimum following specification should be supplied: Wavelength range: 190-800 nm or equivalent; Light source: Deuterium: Spectral Resolution: 1.2 nm per photodiode: Lamp optimization software, accuracy +/- 2 nm.
- k) **Columns:** 2.1 x 100 mm, 1.7 or 1.8 μ, C8, C18, PFP, CN, CSH columns should be quoted for various compounds separation. Suitable guard columns must be quoted for all above columns must be quoted. HPLC columns should also be quoted in C8, C18 with 2.5 micron must be quoted. Additional columns, if any required for future use may be suggested and must also be quoted separately

Bidders should quote for all consumables like columns (as mentioned above), needles, 96-well plates and kits routine maintenance parts and beginners kits for LC and MS for easy maintaining system.

18. Cell Volume: 500nL cell volume to avoid peak dispersion (optical path must be 10 mm to avoid peak height loss), Leakage detection.

19. Service Support: It should be given in writing about service support system for both LC and MS system until at least warranty period, even if the quoted system is from two different

manufacturers. Users will not contact two different manufacturers (LC and MS in this case) for service related issues. Preferably a pre-agreement has to be done by the Mass Spec Vendor with LC companies in such cases. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts.

Suppliers must have any active support base in Gandhinagar/ Ahmedabad region and written promise about providing service within 72 hours of instrument down time. Indicate also the number of service engineers present in the region.

20. Warranty: The complete instrument and accessories excluding consumable items should be under warranty period for a period of four years from the date of installation. Quote for the additional price after the standard warranty.

The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the installation of the instrument.

21. Relocation Expenses: IIT Gandhinagar is presently situated in its temporary campus (VGEC campus, Chandkheda, Ahmedabad). This instrument is expected to be relocated to a permanent campus. So a onetime relocation costs (within or outside warranty period) should be quoted separately.

22 Operation and Service manuals (in English) should be provided.

23 User list with contacts: Vendor should provide us a list of recent installations of the quoted model in India with all contact details and model details and modules available so that IIT Gandhinagar can approach the contact person for any feedback

24 Installation and training: Installation should be done by the manufacturer and on-site application training must be given to the users free of cost.

25 Quote must have a compliance report on all the above points. A detailed specification sheet highlighting all above specification along with detailed experimental conditions must be attached.

26. Optional Items

- a **Solid Probe:** An atmospheric pressure solids analysis probe for the direct sampling and introduction of solids and liquids. This probe should fit the ESI/APCI source that is supplied with the instrument as standard.
- b Vendor may highlight important points such as future upgradeability and capabilities for our reference.
- c. Indicate whether the Manufacturer or/and its authorized agent/representative is willing to explore the possibility of running the installed equipment at the IIT Gandhinagar as per terms and conditions mutually agreed by both the parties, provided it should not hinder or effect IIT Gandhinagar's research activities. If it is possible the separate pricing should be quoted separately with such possibilities.