

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032

Tender Notice

NIT No. ; IACS/Mat.Sc./BND/2016-17/55

Date:09/11/2016

Sub: Procurement of “UHV Chamber with in-situ magnteo-optic Kerr effect (MOKE) system along with attachments: (i) Load-lock/Reaction Chamber, (ii) UHV Suitcase for sample transfer”.

Sealed tender in two bids system (technical bid and price bid) is invited from bonafide, resourceful, and eligible manufacturer/exclusive distributor/vendors for “UHV Chamber with in-situ Magnteo-Optic Kerr Effect (MOKE) system along with attachments: (i) Load-lock/Reaction Chamber, (ii) UHV Suitcase for sample transfer”.

Part-I (Technical Bid) of the tender should contain technical specifications in detail as well as commercial terms and conditions. Part-II (Price Bid) should clearly indicate item-wise price, if needed, as mentioned in the technical bid. The Technical Bid and Price Bid are to be submitted in separately sealed envelopes, distinctly marked accordingly and both to be put inside another envelop, that should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Completed tender bids should reach the office of **Department of Materials Science, Indian Association for the Cultivation of Science (IACS), 2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032** on or before the scheduled date and time specified below:

Tender Notice No.	IACS/Mat. Sc./BND/2016-17/55 Date: 09/11/2016
Last date and time of submitting tender	07.12.2016 upto 12:00 noon
Pre-bid meeting to discuss technical specification	28.11.2016, 2:00 p.m. at S.N. Bose Hall, IACS
Date and time of opening tender (Technical Bids)	07.12.2016, 1:00 p.m. at IACS
Date and time of opening of Price Bid	The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.
Place of opening tender	C.V. Raman Hall, IACS
Contact	Prof. B. N. Dev, E-mail: msbnd@iacs.res.in

The technical bids will be opened first to judge/evaluate the technical specifications of the said instrument and thereafter the price bids of only technically qualified bidders will be opened.

Technical Bid Evaluation: The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

Opening of price-bid: The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or reimburse any expenses to any of the bidders for attending opening of technical bid.

1. TECHNICAL BID

The technical bid should contain technical specifications and should be kept in a separate sealed envelope duly superscribed as ‘TECHNICAL BID’ on the outer cover of the envelop as already detailed above. It should be clearly mentioned on the

envelope as "Technical Specification for UHV Chamber with in-situ Magneto-Optic Kerr Effect (MOKE) system along with attachments: i) Load-lock/Reaction Chamber, ii) UHV Suitcase for sample transfer".

Technical Specifications for "UHV Chamber with in-situ magneto-optic Kerr effect (MOKE) system along with attachments: (i) Load-lock/Reaction Chamber, (ii) UHV Suitcase for sample transfer".

A. UHV chamber and components

A UHV chamber for the in-situ real time studies of ultra-thin magnetic films and multilayers with film deposition by e-beam evaporation. The following measurements are planned in-situ in the chamber.

- i) Magneto optical Kerr effect (MOKE)
- ii) Magnetoresistance

The material for the UHV chamber is SS304L. The diameter and the height of the chamber should be 300 mm and 500 mm respectively. The chamber should be mounted on adjustable rigid steel frame and have ports for (i) sample manipulator (top mounting, sample plane horizontal), (ii) pumping system, (iii) load-lock chamber attachment, (iv) UHV suitcase for sample transfer, (v) electron gun and its electrical feed through, (vi) broad beam and low energy ion beam sputtering gun, (vii) laser in and out for MOKE (both 35 CF), (viii) thickness monitor, (ix) adequate number of view ports with necessary shutters, (x) additional ports for electrical feed through and masking systems.

Appropriate vacuum pumps to obtain a vacuum range – less than 2×10^{-10} mbar. Vacuum measurement systems with controller.

Components:

1. UHV electromagnet (Quantity 1)

For MOKE technique, an electromagnet with variable magnetic field at the sample location is needed in order to record hysteresis loop of the magnetic thin films. In the present application magnetic field is needed in UHV conditions for in-situ studies. Poles will go inside the UHV chamber. Coils of the solenoids should be mounted outside of the vacuum parts. Expected field at the sample is about 3k gauss; Poles should be made of soft magnetic material with UHV compatibility. Computer controlled high precision power supply for the electro magnet. Max. step of the field between the poles inside the chamber should be 1 Oe.

2. Sample Manipulator (Quantity 1)

Sample Manipulator along with transferable sample holder would be mounted on top flange of 100CF and sample will be mounted horizontally. 4-axes UHV manipulator (X, Z, R1, R2). X –range: ~ +/- 10 mm, resolution: 0.1 mm. Z-travel: according to the design with 5 micron resolution. R1 (sample rotation): $\pm 180^\circ$ azimuthal rotation with minimum resolution of 1° . R2 (sample tilt): $\pm 10^\circ$ rotation module with minimum resolution of 1° . (motorized version for all axes optional).

Provision of sample cooling (up to Liquid Nitrogen) and heating up to 800°C; Four extra pins through electrical feed through of the manipulator for resistivity measurements; Sample may be loaded and received from chamber through a sample receiving station through a gate valve, which could be mounted 63 CF flange .

3. UHV Electron gun (Quantity 1)

Electron gun will be used to evaporate especially magnetic materials. The length of the gun would be such that the active crucible should come at the center of the chamber.

Detail specifications: Electron gun with 3kW power, linear 3 pocket electron beam source with shutter and water cooling, capacity of the crucibles ~ 1.5 cc, power supply, controller, cables and accessories, power conditions: 230 V, 50 Hz.

4. Quartz microbalance with thickness monitor

Nonmagnetic housing, manual shutter, 250°C bakeout temperature, rotatable DN40 CF mounting flange, water cooling, rate/thickness monitor, appropriate linear shift for adjusting precisely the position of quartz sensor inside the chamber.

5. Load-lock/reaction chamber

Chamber vacuum should be in 10^{-8} mbar range with appropriate turbo molecular pump and dry fore-vacuum pump. Appropriate vacuum gauges, 2 viewports, preliminary heating, and 2 ports for external gas inlet connections, DN 63CF gate valve and bellows to connect with the UHV chamber. Linear transfer for load lock and UHV chamber (mechanical without any magnetic parts)

6. UHV transfer suitcase

For transporting the samples between different UHV systems in UHV conditions. Samples placed on sample holders may be stored and transported inside the transport box without changing pressure level. Ion getter pump, power supply, gauges, view ports, wobble stick.

7. Accessories

Magnetic measuring equipment – Hall effect Gaussmeter, Monitor with CCD camera for observation of the sample, 19" cabinet for all electronics units, Bakeout set, LED illumination system for chambers, Installation and set of operating users manual, serial communication cards to communicate with instruments, computer with necessary equipments.

Optional

8. Sputter ion source (Quantity 1)

Low energy ion beam gun with flat ions profile is needed for substrate cleaning and patterning

Detail specifications: Beam energy 100eV to 5 keV, Differentially pumped, Parallel and flat beam profile (with divergence less than 5 degree), working distance from end of the source to sample between: 100 to 150 mm, working pressure 10^{-7} mbar, Focus size 5 mm to 20 mm, Beam scanning (optional), Direct gas entry into the ionization chamber, Cathode should be suitable in general for gases such as Ar, Xe, O₂, H₂, and N₂ etc, option for linear shift along and away from the sample (optional), No use of magnetic field, DN40CF or DN63CF mounted. Controller, cables and accessories, power conditions: 230 V, 50 Hz.

B. Components for MOKE measurements

1. He-Ne laser (quantity-1)

(i) Option for both In and Fr stability modes, (ii) Output power more than 1.0 mW, (iii) Beam diameter 0.5 mm, (iv) Beam divergence ≤ 1.8 mrad, (v) Transverse spatial mode polarization – linear 1000:1, (vi) Intensity stability +/- 0.1 % (for 1 min) and +/- 0.2 % (for one hour), (vii) Frequency stability +/- 3.0 MHz (for 1 min) and +/- 5.0 % (for one hour), (viii) Resonator characteristics – TEM₀₀, (ix) Suitable for MOKE measurement.

2. Digital mode lock-in amplifier (quantity-1)

(i) Voltage input: Single ended or differential, (ii) Sensitivity: 2 nV to 1 V, (iii) Noise: 6 nV/VHz at 1 kHz, 0.13 pA/VHz at 1 kHz (10^6 V/A), 0.013 pA/VHz at 100 kHz (10^6 V/A), (iv) Dynamic reserve: > 100 dB (without pre-filters), (v) Stability: 5 ppm/°C, (vi) Reference channel frequency range: 0.001 Hz to 102.4 kHz, (vii) Reference input: TTL or sine (400 mVpp min), (viii) Phase resolution: 0.01° front panel, 0.008° through computer interfaces, (ix) Absolute phase error: < 1°, relative phase error < 0.001°, (x) Phase drift: < 0.001°/°C below 10 kHz, < 0.1°/°C for 10 kHz to 100 kHz, (xi) Harmonic detection: 2F, 3F,... nF to 102 kHz (n < 19,999), (xii) Stability: Digital outputs and display: no drift, Analog outputs: < 5ppm/°C for all dynamic reserve settings, (xiii) Time constants: 10 μ s to 30 ks (6, 12, 18, 24 dB/oct rolloff), synchronous filters below 200 Hz, (xiv) Internal oscillator range: 1 mHz to 102 kHz, (xv) Two channel display, (xvi) IEEE-488.2 and RS-232 interface standard (all instrument functions can be controlled using IEEE and RS-232), (xvii) Provisions for channel 1 & 2 outputs, X, Y outputs, sine out, TTL out etc., (xviii) The item should be of a standard company make or equivalent.

3. Photo-elastic modulator and photo detector (quantity-1)

Modulator: (i) Noninterference option, (ii) Operating frequency: 50 kHz, (iii) Half wave retardation range: 200 – 300 nm, (iv) Sensitivity: 10^{-6} or better, (v) Option for RS232 and GPIB interface.

Silicon photo detector with built-in pre-amp: (i) Active area: ~20 mm², (ii) Operating temperature range: up to 70°C, (iii) Input power bipolar 12 to 18 V, (iv) Frequency range: DC to 500 kHz, (v) Output signal directly to lock-in amplifier, (vi) Provision for adjusting the dark current or background null, (vii) suitable for MOKE measurements.

4. Polarizers (quantity-2)

(i) Calcite prism polarizers of Glan-Taylor type, (ii) Extinction ratio: 1x10⁻⁵ or better, (iii) Anti-reflection coating on the entrance and exit sides, (iv) Clear aperture ~10x10 mm, (v) Required prism holder with 360 marking on the housing with 1° resolution (preferable 0.1°), (vi) Suitable for MOKE measurement.

Suppliers may quote (i) both A and B or (ii) only A or only B.

Warranty: Minimum 1 year while 3 years warranty will be preferred.

Service Facility: Supplier should mention details of the service setup and they should preferably have man powers in India.

Technical compliance chart should be provided following format,

Sr. No	Tender specification	Your offered instrument specification	Extent of compliance

Tender will not be accepted if the technical compliance chart is not provided following the above format.

2. PRICE BID

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly super scribed as 'PRICE BID' on the outer cover of the envelop as already detailed above. Price bids of only technically qualified bidders will be opened and they will be intimated the date and time of the opening of price bid at their e-mail ids. Rest of the bidders will stand rejected.

PRICE: Price to be quoted on Ex-works; CIF/CIP Kolkata and also FOB basis.

3. BID SECURITY:

a. An Account payee Demand Draft/Pay Order for Rs. 5,00,000.00 (Five lakhs only) drawn in favour of "Indian Association for the Cultivation of Science (State Bank of India, Jadavpur University Branch, A/C No. 11079699211, IFSC: SBIN000093, MICR Code: 700002048)" is to be furnished by the bidders except those who are registered with the Central Purchase Organizations, National Small Industries Corporation or the concerned Ministry or Department, as Bid Security money or Earnest Money Deposit (EMD).

b. The Demand Draft for the Bid-Security should have at least 90 (ninety) days validity period of opening of the bids.

c. In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

4. PERFORMANCE SECURITY:

An Account Payee Demand Draft of 10% of the order value in the name of "Indian Association for the Cultivation of Science" is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money or EMD will be refunded to successful bidder on receipt of the Performance security money.

GENERAL INSTRUCTIONS

1. Validity of tender: Tender submitted should remain valid for at least six months from the date of opening the tender. Validity beyond six months from the date of opening of the tender shall be lapsed by mutual consent.
2. The tender should accompany a compliance chart.
3. Incomplete and conditional tenders as well as tenders received after the due date will be summarily rejected without assigning any reasons thereof.
4. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the institute website. Prospective bidders are advised to occasionally to visit the website (www.iacs.res.in/tender) for any amendment.
5. Payments: 100% against delivery and successful installation or 100% Letter of Credit.
6. Installation/Demonstration/Application training at site: Installation & user training at IACS, free of cost by the supplier.
7. Service facility: In India, preferably Kolkata, supplier should mention their details of service setup and man powers who are responsible for after sales support. Response time should be within 24 hrs.
8. The model number, make and a printed literature of the product should be submitted positively.
9. Proposed delivery schedule should be mentioned clearly.
10. Manufacturers / exclusive distributors / vendors should have history of supplying this type of instruments to this or other scientific organizations. Availability of a list in this regard would be preferred.
11. Authorized dealership certificate should be provided in case of principal manufacturing company is not quoting directly.
12. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.
13. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of the technical bids will be the following working day at the appointed time.
14. In case of any dispute, the decision of IACS authority shall be final and bidding on the bidders.
15. For any clarification regarding technical specifications, information etc., please send your queries to Prof. B N Dev (msbnd@iacs.res.in).
16. The authority of IACS reserves the right to reject any or all of the tenders received without assigning any reason thereof.

Registrar (Acting)