



DEPARTMENT OF PHYSICS
MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

No. PHY/MLSU/FIST/2014/1839

24th November 2014

PURCHASE ORDER

28

To
M/s RIGAKU CORPORATION
INTERNATIONAL MARKETING DIVISION
3-9-12 Matsubara-cho
Akishima-shi
Tokyo-1968666
JAPAN

THROUGH
M/s IR TECHNOLOGY SERVICESPVT LTD.,
EL-91, MIDC,
TTC INDUSTRIAL AREA
ELECTRONIC ZONE
MAHAPE, NAVI MUMBAI 400709

REF: E-TENDER No.MLSU/PHYSICS/FIST/2014/ET-1 X-ray Powder Diffractometer

Dear Sir,

With reference to the above cited offer from Your Indian Agent M/s M/s IR TECHNOLOGY SERVICESPVT LTD.,MUMBAI, We are pleased to place an order for supply of RIGAKU MAKE MODEL UTLIMA-IV X-RAY DIFFRACTOMETER as per following details:

Sno	Item	Qty	Cost(CIP Cost at Delhi Airport)
1	Rigaku Make Model Ultima-IV X-ray Diffractometer. (As per technical Specifications enclosed)	One	Jap.Yen 12,200,000/-
2	Thin Film Cradle as attachment to above unit (As per technical Specifications enclosed)	One	Jap Yen 1,900,000/-
3	Small Angle Scattering Accessory Slit SAXS section as attachment to above Unit(As per technical Specifications enclosed)	One	Jap. Yen 1,100,000/-
	TOTAL		Jap. Yen 15,200,000/-

I: TECHNICAL SPECIFICATIONS OF Rigaku Make Model Ultima-IV X-ray Diffractometer:

1. System Description

- 1.1. Supply, installation and performance demonstration of floor mounted, fully automated X-ray Diffraction (XRD) System with Thin film Analysis attachments with necessary hardware and software at the Department of Physics, Mohanlal Sukhadia University, Udaipur
- 1.2 The thrust area using the system will be to analyze polycrystalline materials, oxide materials and thin film epitaxy. The hardware and software of the proposed system to support various applications/analysis including phase identification, quantitative analysis, percent

crystallinity, FWHM, crystallite size determination, orientation, unit cell refinement, indexing, Bravais lattice symmetry, space group determination etc.

1.3 The vendor must provide detailed specifications of the infrastructural requirements for the XRD system. The tender should provide the clear timeline by which the system will be built, inspected and shipped and installed. The complete system should work at 50Hz, 200-240V single Phase/440V three Phase.

1.4 The system should conform to Indian and International Safety standards and regulations pertaining to X-ray Radiation and other Hazards. The vendor has to provide certificate stating the radiation dosage for the quoted model. This should be below 1 microsievette/hour at a distance of 10 cms from the surface of the instrument at full load.

1.5 The X-ray to be ON during the actual experiment only. It should have safely Interlock system both for radiation and mechanical failure.

1.6. The cabinet should have stringent safety requirements with respect to contamination of X-rays and radiation safety ensuring the negligible radiation outside the cabinet and auto Xray off upon accidental opening of cabinet doors during the run.

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

1.8 Flawless safety mechanism against over voltage, overpower, overcurrent, overload, abnormal input mains voltage or temperature. Automatic switch off of X-rays in case the cooling water temperature rises beyond a certain limit or its flow rate drops beyond a certain limit.

2. X-ray Generator:

2.1 Output Power: 3.0kW

2.2 Voltage: ≥ 50 kV should be possible to set in increments of 1kV

2.3 Anode current: ≤ 60 mA should be possible to set in increments of 1mA.

2.4 Output stability: $\pm 0.05\%$ (at 10% power supply fluctuation)

2.5 Control: Fully controlled through Windows based PC software. User could able to set the

2.6 Voltage and current using the software loaded on the PC

2.7 Safety: Abnormal cooling water flow, pressure and temperature detection, abnormal generator overload detection, leak current breaker, shutter malfunction detection. Options of X-ray power manual and autostart-up/shutdown

2.8 Power supply should be compatible with the Indian electricity supply conditions.

3. X-ray Tube:

3.1 X-ray tube output of 2 kW of the latest technology following international standards. The tube must be ceramic or glass any other equivalent tube of Cu target with operational simplicity during change over to different functions.

3.2 The X-ray tube should have protection against under-voltage, overload, over-voltage, over-current and/or failure of water supply.

3.3 Should have safety features like door interlock mechanism (by which X-ray can be generated only after door is closed), emergency stop, safety shielding devices, etc.



(4) Goniometer:

- 4.1 Type: Theta Theta type
- 4.2 Scanning Radius equal to or more than 240mm
- 4.3 Min. step angle: 0.0001 deg.
- 4.4 Angle Reproducibility: +/- 0.0001 deg.
- 4.5 Effective Two Theta Scanning angle range 0 to +150 deg or more.
- 4.8 Operation modes: Continuous scan measurement, step scan measurement, calibration, positioning, ω axis oscillation (when using 2Theta continuous scan or step scan).
- 4.9 Slewing speed: 500 deg./min. (2 θ)
- 4.10 Scanning speed: 0.001 deg. to 100 deg./min
- 4.11 Automatic variable slits for Divergence, Scattering and Receiving sides.
- 4.12 Slit for basic Thin Film

5. Detector

- 5.1 Detector: Scintillation counter NaI(Tl) or Proportional counter.
- 5.2 Scaler
- 5.4 Baseline and window auto control

6. Others

- 6.1 Essential optical systems for enabling the system to work in Focusing mode and with Parallel mode using Multilayer Mirror system
- 6.2 Diffracted Beam Monochromator for Copper
- 6.3 Manuals, connecting cables, etc.
- 6.4 Step down transformer, if any, required for operating the unit with Indian Power supply

7. Water recirculating chiller suitable for the X-ray diffractometer

Heat dissipation: Suitable for 3kW Xray generator, Water pressure 3-5kg/cm² or better, Water flow rate: Minimum 8 lit/min, Water temperature 15-20deg C (Adjustable), Temp. Control unit, facility to monitor supply pressure, tank water level, Safety for compressor failure, insufficient water etc.

8 Software:

- All data acquisition, data processing and operation software must be provided
- Universal ASCII pattern file import and export.
- Continuous zoom and pan
- Background and K alpha² elimination.
- Automatic and/or manual peak finding.
- Peak characterization
- Crystallite size estimate
- Profile fitting with crystallinity estimates.
- Advanced smoothing functions.
- Graphical pattern editing.
- Multiple pattern overlays.
- Peak comparison from pattern overlays
- Internal and external theta calibration.
- Detector dead-time correction.
- Pattern simulation from D-I lists
- D-I list editing and file import.



9. Spare parts for 5 years operation including Glass, Aluminium sample holders (20 each). Also provide 2 Low Background Sample holders.

10. Warranty for one year

11. Deliverable documents

11.1 System Operational manual in Print and CD

11.2 System Maintenance Manual in Print and CD

11.3 Calibration Procedure Manual in print and CD

11.4 Complete set of service manuals for all OEM Products, circuit diagrams of sub systems and electronic boards

11.5 Complete set of Engineering Drawings

11.6 Test reports for all the mode of operations

11.7. Complete list of part numbers of the equipment

11.8. Certificate of country of origin from manufacturer

11.9. Installation to be done Free of Charge at our campus and after installation performance demonstration report should signed by the Engineer of the Manufacturer or Indian Agent and incharge of the unit at the University.

II. Thin Film Cradle as attachment to the X-Ray Diffractometer

1. Thin film Cradle

1.1 Advance analysis software for thin film samples with sub micron thickness

1.2 All necessary hardware and software and accessories for Grazing Incidence Diffraction application must be provided.

1.3 sample size: >-100mm diameter, >- 3mm thickness

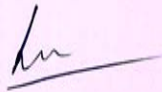
1.6 Sample direction: Horizontal mount

III Small Angle Scattering Accessory Slit SAXS section as an attachment to the X-ray Diffractometer

1.Small Angle Scattering Accessory Slit SAXS section for nanomaterials & other smallangles scattering applications with required sample holders.

1.1The system should have all the slits and Optics to work at least to SAXS resolution of 0.1deg.

1.2Application software for analysis of Particle size and shape.



Terms and conditions:

1. The supply, installation and commission of the equipment must be made as per terms and conditions of the E-tender
2. A performa Invoice from the Supplier must be submitted for the equipment to enable opening of Letter of credit.
3. The Indian Agent of the supplier and the Bidder, M/s IR Technology Services, Mumbai will be required to submit an agreement (available on web site www.mlsu.ac.in) on a Non-Judicial Stamp paper agreeing to supply and install the equipment and demonstrate the performance as per terms and conditions of the tender as per specifications of the equipment and also required to submit a Bank Guarantee/Demand Draft for 5% of the cost of the equipment Rs.4,05,000/- on or before ~~1-12-2014~~ 8-12-2014 *ku*
4. The equipment must be supplied within a period three months from the date of opening of Letter of credit.

Kapshi
HEAD

Copy to:

1. M/s IR TECHNOLOGY SERVICES PVT LTD., EL-91, MIDC, TTC INDUSTRIAL AREA , ELECTRONIC ZONE, MAHAPE, NAVI MUMBAI 400709 to take immediate steps to obtain performa Invoice, execute agreement and deposit 5% security before the prescribed time period.

Kapshi
HEADHEAD
Department of Physics
Mohanal Sukhadia University
Udaipur

C.S.
sh.
COMPTROLLER
Sukhadia University
Udaipur