



INSTITUTE OF NANO SCIENCE AND TECHNOLOGY, MOHALI

(An autonomous Research Institute of Department of Science and Technology,
Government of India)

Habitat Centre, Sec-64, Phase X, Mohali – 160062, PUNJAB

Phone No: 0172 – 2210073/74/75, Fax No: 0172 – 2211074

Website: www.inst.ac.in

Ref No. INST/12(109)/2019-Pur

Date: 22/11/2019

CORRIGENDUM

Reference to NIT no. INST/12(109)/2019-Pur published in national newspapers for purchase of equipment: Complete Ultrahigh Vacuum (UHV) System for X- Ray Photoelectron Spectroscopy (XPS) and Ultraviolet Photoelectron Spectroscopy (UPS) and Depth Profiling. Below mentioned technical points may be read and corrected as per following:-

S. No	Modified Specifications after pre bid meeting
1.	The XPS system should be able to perform standard as well as advanced surface analysis and obtain chemical bonding information of powder samples, nano structured and thin film material including semiconductors, metal alloys, ceramics, magnetic materials, glasses, polymers and other insulators. The ability to provide complete XPS experiment including mapping survey spectra, narrow region spectra from elements of interest and sputter depth profiling (argon ion and cluster) as well as angle dependent XPS analysis. The ability to acquire spectra and images of the sample of interest with a 15 μm spatial resolution.
2.	Analysis chamber made of Single piece precision-machined alloy such as Mu-metal or Ni-Fe alloy to obtain UHV and shield from magnetic fields.
3.	Dedicated TMP's ($\sim 2601/\text{s}$ or higher capacity) for both load lock and analysis chambers backed with oil free pump. Titanium sublimation pump should be mounted in the analysis chamber to achieve base pressure of $\sim 5 \times 10^{-9}$ mbar (or better). Pirani and ion gauge controllers for both load lock and analysis chamber. The analysis chamber base pressure after baking and cooling must be guaranteed at 5×10^{-9} mbar or better for ultra-high vacuum (UHV) surface analysis.
4.	Necessary gauges, interlocks, gate valves which are electro-pneumatic type should be provided for protecting the integrity of vacuum system and critical components, like the analyser, in case of power failure, vacuum failure and disruption of water supply, etc.
5.	System should be fitted with Monochromated Al K α (1486.6 eV) and a UV Source.
6.	Instrument should be capable of performing photoemission measurements on multiple points on the sample with small spot/aperture size of 15 μm or better.
7.	Instrument should be capable of performing imaging with resolution of 15 μm or better.
8.	Instrument should be equipped with robust charge neutralization setup using both electrons and ions, with minimum adjustable parameters and should be software controlled to measure spectra on insulating, metallic and electrically isolated samples.
9.	System should include 120 mm mean radius or greater, full 180° Hemispherical analyser with 128 channels detector or more.



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10.	Sample holder stage should be able to accommodate large size sample holders of size ≥ 50 mm diameter or ≥ 1800 mm ² area with option to place ≥ 15 samples.
11.	<p>Dedicated sample holders for solids, powders, fibres, rotational and tilting studies should be offered. The sample holder set should include</p> <ul style="list-style-type: none"> • Two multi-specimen standard mounting plates • One dedicated holder for powder samples • One dedicated holder for fibre samples • One rotational holder <p>Tilting holder: Instrument should have a tilt module to perform angle dependent X-ray photoemission spectroscopy in the range of 0 to 90⁰ or better.</p> <p>Vacuum transfer holder: A sample holder capable of transferring samples from a glove box environment to the vacuum system without exposure to air must be supplied. The sample holder must be able to transfer samples into the vacuum system without operator intervention once the transfer vessel has been introduced into the sample load-lock.</p>
12.	System should be fitted with automated X, Y, Z, precision manipulator system for translation of the sample holders, its rotation and tilt, etc.
13.	A software controlled, variable, fine focused inert gas (Ar, He, Ne, Xe) ion source must be provided for surface cleaning and high speed depth profiling. Suitable gas admittance system, differential pumping and source power supply must be supplied. System should be capable of integrating high-performance ion gun, utilizing Argon gas, which is capable of operating in both cluster and ion mode for depth profiling and surface cleaning of both soft and hard materials. The outcome energy from Ar ⁺ cluster mode should be variable from 1 eV to 80 eV or greater per atom. Clear evidence must be provided if such a claim is being made.
14.	Ar ⁺ ion source should be capable of surface cleaning and should be used for depth profiling experiment. Depth profiling and photoemission measurements (using x-ray and UV source) should be synchronized and automated.
15.	Optical imaging of the entire sample holder in load lock with zoom in/ High magnification option should be provided for easy identification of spot at which measurement is desired. Optical Imaging of the sample in the analysis chamber should be provided.
16.	Software controlled focus, auto Z axis optimization and coordinated control of analyzer and manipulator using the optical image is a must. System should also be capable of sequential selection of multiple samples for analysis, placed on a single sample holder automatically.
17.	Closed cycle water cooling system including air compressor, etc from original equipment manufacturer (OEM) should be provided.
18.	All necessary accessories for installing the mentioned system should be quoted. All power supplies should be placed in a cabinet < 24" diagonal width or should be integrated in the main system to a clean arrangement.



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19.	Workstation grade latest computer (two nos.) with preloaded software is required for running, visualizing and controlling all the functions the system. The workstation configuration should not be inferior to Core i5 Processor 4 GB RAM, 1 TB HDD, 23" LCD desktop. One no. of double sided color Laser Printer should also be supplied.								
20.	Data analysis computer with the latest configuration should be offered.								
21.	Data Analysis/processing software with 5 licensed copies should be provided.								
22.	<p>Instrument should have 3-years of comprehensive warranty. Additional warranty of 2 years after the completion of 3-year comprehensive warranty should be quoted separately. Consumables and spare parts for 5 years of operation should be quoted in the main system.</p> <p>The consumables list should include the below items with a part number and quantity</p> <ul style="list-style-type: none"> • X-ray anode kit, x5 • Emitter kit, x 5 • Flood gun filament kit, x 5 • Cluster source filament kit, x 5 • Channel plate kit, x 2 • Sublimation pump filament kit, x 5 • General seal set, x 2 <p>Vendor should clearly mention the names of consumables which has shelf life and can not be stored and those consumables should be supplied as and when required.</p>								
23.	Standard samples of Cu, Ag, Au, PET or any other standard polymer should be inbuilt and placed inside the chamber for calibration and alignment.								
24.	<p>Reflection Electron Energy Loss Spectroscopy (REELS) or equivalent technique should be quoted separately and should fulfill the energy resolution and sensitivity given below:</p> <table border="1" data-bbox="576 1424 1129 1532"> <tr> <td>Energy resolution (FWHM, eV)</td> <td>Sensitivity (cps)</td> </tr> <tr> <td>0.5 or better</td> <td>500,000 or better</td> </tr> </table> <p>Ion scattering spectroscopy (ISS) or equivalent technique should be quoted separately and should fulfill the energy resolution and sensitivity given below:</p> <table border="1" data-bbox="608 1637 1098 1771"> <tr> <td>Energy resolution (FWHM, eV)</td> <td>Sensitivity (cps/nA)</td> </tr> <tr> <td>14 or better</td> <td>25,000 or better</td> </tr> </table>	Energy resolution (FWHM, eV)	Sensitivity (cps)	0.5 or better	500,000 or better	Energy resolution (FWHM, eV)	Sensitivity (cps/nA)	14 or better	25,000 or better
Energy resolution (FWHM, eV)	Sensitivity (cps)								
0.5 or better	500,000 or better								
Energy resolution (FWHM, eV)	Sensitivity (cps/nA)								
14 or better	25,000 or better								
25.	<p>UV Photoelectron Spectroscopy with two separate high precision gas admission valves for Helium I / Helium II should be quoted and should fulfill the energy resolution and sensitivity given below:</p> <table border="1" data-bbox="608 1883 1098 1984"> <tr> <td>Energy resolution (meV)</td> <td>Sensitivity (cps)</td> </tr> </table>	Energy resolution (meV)	Sensitivity (cps)						
Energy resolution (meV)	Sensitivity (cps)								



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		120 or better	2,000,000 or better	
26.	Calibration and alignment: The instrument should offer auto calibration for the following functions:			
	<ul style="list-style-type: none"> • Energy scale linearity • Transmission function • X-ray spot size calibration • Ion gun modes tuning and alignment • Flood gun alignment • Electron lens optimisation • Detector optimisation 			
27.	<p>Automation: The supplied system must include automated features for sample handling, vacuum control and data acquisition allow a spectrometer to be operated in a multi user environment along with other analytical techniques. To meet these requirements the spectrometer should include the following functions.</p> <ul style="list-style-type: none"> • Automated sample transfer. • Automated vacuum control and gas handling. • Automatic sample height adjustment. • Automatic data acquire for wide scan survey spectroscopy and high-resolution narrow scan data. • Automatic data interpretation and quantification • Automatic data reporting • Automatic calibration. 			
28.	The necessary tables for keeping the desktop computers and printer should also be provided with the instrument.			
29.	The other party/ local items such as necessary gas cylinders and regulators (2 nos.) to operate the whole system should be provided.			
Item Nomenclature and requirements				
1.	<p>Vendor qualification: Only original manufacturer with established facility to manufacture and with in-house capability to assemble and integrate all subsystems of the mentioned equipment is eligible to apply. A brief profile/history of the company is required.</p>			
2.	Submission of list of end-users, their complete contact address to show that more than 5 units of similar or equivalent models have been supplied worldwide in last 5 years.			
3.	It is mandatory that vendor provides information (complete contact address and supporting documents like purchase order etc.) about all similar systems supplied by them in INDIA. These documents are necessary to gauge the quality of the product and service support.			
4.	a) Documentary evidence should be provided showing the capability of the instrument to perform charge neutralization using both electrons and ions, its principle of charge neutralization in the form of application note or/and publications on highly insulating sample with sufficiently high intensity.			



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	b) Documentary evidence of count rate using monochromatic Al K α should be provided on standard polyethylene terephthalate (PET). We expect that the offered system shows counts > 10,000 cps or better with FWHM better than 0.82 eV for the Ester peak.								
	c) Documentary evidence showing that using monochromatic Al K α , Ag 3d $_{5/2}$ photoelectron peak intensity has following minimum count rate for 1.0 eV or better resolution with a X-ray source energy of < 100 watts. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Spot size / aperture size</th> <th>Minimum cps</th> </tr> </thead> <tbody> <tr> <td>15 μm or smaller</td> <td>30,000 or better</td> </tr> <tr> <td>100 – 110 μm</td> <td>500,000 or better</td> </tr> <tr> <td>Large area analysis 400 μm or smaller</td> <td>3,000,000 or better</td> </tr> </tbody> </table> <p>System with higher intensity/cps will be preferred.</p>	Spot size / aperture size	Minimum cps	15 μ m or smaller	30,000 or better	100 – 110 μ m	500,000 or better	Large area analysis 400 μ m or smaller	3,000,000 or better
Spot size / aperture size	Minimum cps								
15 μ m or smaller	30,000 or better								
100 – 110 μ m	500,000 or better								
Large area analysis 400 μ m or smaller	3,000,000 or better								
	d) Documentary evidence showing that instrument can perform imaging with resolution of 15 μ m or better.								
	e) Documentary evidence should be provided for angle-dependent studies demonstrating that specimen stage control maintains the original analysis position when the angle is changed during analysis.								
	f) Documentary evidence showing that the instrument can perform automated depth profiling of XPS and UPS simultaneously without manual intervention.								
	g) Documentary evidence in the form of application note should be provided for depth profiling using Ar $^{+}$ cluster capability of the instrument on a multilayered sample consisting of both conducting and insulating material using monochromatic Al K α .								
	h) Documentary evidence should be submitted to prove minimum energy step size at different Pass Energies must be specified for the offered system.								
	i) Submission of detailed installation report of recently installed and commissioned similar system should be furnished to access the true capability and performance of the system. Mentioned performance should also be demonstrated at our site.								
5.	The spare parts of quoted model should be available for the entire period of warranty and AMC.								
6.	a) Supplier should have service networks in India by them or through dealers. b) Agreeing for a pre-dispatch Inspection at the company site.								
	c) Submission of valid authorization certificate from manufacturers (in case of dealers or representatives).								
7.	Instrument should have 3-years of comprehensive warranty of all the parts and services. Additional warranty of 2 years after the completion of 3-year comprehensive warranty should be quoted separately.								
8.	Annual Maintenance Contract (AMC) should be quoted for all parts and services as optional for three years, after the 5 years warranty period.								
9.	Installation and training: on-site installation and demonstration of the system along with training to get hands-on experience with the system at our premises for group of users.								
10.	Time-to-time training should be conducted as per the requirement of the user.								



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11.	10 kVA UPS with 30 minutes back-up for the smooth functioning of the instrument should be quoted as optional item.
12.	Service Support: Vendor should provide service engineer's details. Company should provide the on-site service within 7 days time after the intimation from the users.
13.	Pre-installation requirements should be clearly mentioned in the bid.
14.	Installation at the desired place of the institute.

The last date for receipt of tender has been extended upto 19/12/2019 till 2:00PM which will be opened on the same date at 3:00PM at INST, Mohali. The other details of the tender shall remain unchanged.

Sd/-
H.O.O