



भारतीय प्रौद्योगिकी संस्थान भिलाई
जी.ई.सी. कैंपस, सेजबहार, रायपुर - ४९२०१५
छत्तीसगढ़, भारत

Indian Institute of Technology Bhilai
G.E.C. Campus, Sejbahar, Raipur - 492015
Chhattisgarh, India

Date: 04-07-2023

CORRIGENDUM-2

This is in reference to the tender no. IITBh/Goods/CIF/2023-24/026 Dated: June 02, 2023 for "Supply & Installation of X-ray and Ultraviolet Photoelectron Spectroscopy at IIT Bhilai"

Following changes are made in Tender Document. The rest of the specifications/conditions mentioned in the tender remain the same.

1. Revised technical specification –

SI.No	Criteria	Existing	To be read as
1.	System	The system should be able to perform analysis on samples of semi-conductors, alloys, ceramics, glasses, polymers, magnetic materials and insulators. Instrument should have the features to conduct XPS experiments including imaging, survey spectra, narrow region spectra, depth profiling, angle-dependent studies and UPS analysis and work function measurements. The Instruments should be delivered with all accessories necessary to make it fully operational including a recirculating water chiller (if any) from OEM and suitable compressor (if any).	In addition to the mentioned the following onsite upgradability is required. Inverse photoelectron spectroscopy and Auger electron spectroscopy.
2.	X-ray source	a) Al K-alpha X-ray source with monochromator with a monochromaticity of 220 meV or better. It can be mentioned as FWHM of the radiation after monochromator.	Al K-alpha X-ray source with monochromator with a monochromaticity of 200 meV or better. It can be mentioned as FWHM of the radiation after monochromator. Supporting documents from the OEM shall be supplied.
3.	Load lock	a) Should be provided with a camera that gives a global view of sample holder. b) Sample introduction chamber should allow samples transferred into analysis chamber automatically. c) The introduction chamber should have a turbo-molecular pump backed up by an oil free pump.	No change
4.	Analysis chamber	a) The chamber must have a high-quality optical camera to view the analysis position of the sample. b) The analysis chamber should have appropriate alloy for magnetic field shielding and protection from X-rays. c) The analysis chamber should have a combination(s) of turbo molecular/ion pump/titanium sublimation pump to achieve the required vacuum levels. No cryopumps are allowed.	g) Also, the distance (in mm) between the top of the CF window (point (f) above) to the sample analysis spot should be provided. The supplier may wish to furnish the drawings.



		<p>d) The analysis chamber base pressure after baking and cooling should be guaranteed at 5×10^{-9} mbar or better.</p> <p>e) A set of safety and interlock features should be available for the vacuum system, components and electronics in case of power, vacuum or chilled water failure.</p> <p>f) A MgF₂ window (CF40 or equivalent) should be available on the chamber so that an external light can be shined on the sample.</p> <p>g) Also, the distance (in mm) between the top of the CF window to the sample analysis spot should be provided.</p>	
5.	Sample holder Stage manipulator	<p>a) Must have capability of movement in X, Y, Z and rotation. All the axes must be motorized and must be controllable from the system software. Standard samples (example Au, Ag and Cu, Phosphor screen etc) should be provided for calibration and located inside of the analysis chamber.</p> <p>b) Area of the sample holder should be 2400 mm² or better</p> <p>c) Allowed sample thickness: 10 mm or higher</p> <p>d) Sample stage position resolution: 5 μm or better</p> <p>e) Stage position reproducibility. This is required in case if the sample needs to be analyzed again (before unmounting): 5 μm or better</p> <p>f) Tilt angle in deg: >90 deg</p> <p>g) Tilt angle resolution: 1 deg or better</p> <p>h) Tilt angle reproducibility: 0.5 deg or better</p>	<p>e) Stage position reproducibility. This is required in case if the sample needs to be analyzed again (before unmounting): 10 μm or better.</p>
6.	Electron energy analyser	<p>a) Hemispherical or equivalent analyzer must be supplied with suitable mean radius. It is important to note that the radius will affect the ultimate energy resolution of the system.</p> <p>b) The energy scan range should be at least 100 to 1490 eV or wider.</p> <p>c) Minimum energy step size at different Pass Energies must be specified.</p> <p>d) The analyser should be able to acquire XPS measurements in both spectroscopy and mapping analysis modes</p> <p>e) Ultimate energy resolution of the system. Bidder must submit supporting documents on how the OEM has calculated the energy resolution: 230 meV or better</p>	<p>e) The bidder must submit supporting documents on calculation (theoretical) of ultimate energy resolution of the system with the experimental parameter values.</p> <p>The following values should be fulfilled and demonstrated at the time of installation.</p> <p>The full width at half maximum (FWHM) value of Ag3d_{5/2} should be ≤ 0.60 eV.</p> <p>The full width at half maximum (FWHM) value of C1s peak on PET sample should be ≤ 0.85 eV.</p>
7.	Mode of analysis	<p>a) Should be able to perform point analysis, line scan, area scan, chemical mapping, depth profiling and angle dependent analysis.</p>	No change



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		<p>b) Angle dependent XPS and UPS capability must be motorized (automatic) and maintain the original analysis position as the tilt angle changes.</p> <p>c) Spatial resolution of 2D X-ray imaging/chemical mapping of the sample should be 20 um or better. The supplier should clearly mention how the resolution is calculated. Should also supply supporting documents/notes (not the brochures).</p>	
8.	Ion gun	<p>a) The instrument must have the capability for effective depth profiling of samples using Ar+ ion sputter gun.</p> <p>b) The gas handling and applicable pumping mechanism should be automated.</p> <p>c) Ion gun settings should be auto calibrated using a routine with the help of built-in standard apertures for beam alignment.</p>	No change
9.	Charge Neutraliser system	<p>a) The instrument must be equipped with a robust charge neutralization system by using both low energy electrons and/or ions or their combination.</p>	No change
10.	System software	<p>a) User license for professional data analysis software for data processing and evaluation together with reference database must be supplied and demonstrated. Software should include extensive spectral databases and spectral searching capability for element identification.</p> <p>b) Easy to use software packages must be provided for instrument operation, data reduction and automated analysis.</p> <p>c) Software must offer full control of XPS operation including X-ray source, vacuum management, charge neutralizer, sample stage, automatic sample height alignment, automatic depth profiling and sequential angle dependent XPS as well as multi-task analysis. All parameters and the sequence of tasks must be possible to be pre-defined by the user.</p> <p>d) Data processing should be available on the computer connected to the equipment as well. Software for deconvoluting the core and valance levels must be supplied. Open source softwares shall not be quoted and will not be considered. A video of deconvolution with an appropriate background on some test samples shall be submitted for technical evaluation.</p> <p>e) Exporting of data, images, etc. in standard formats for third party plotting softwares is mandatory.</p>	<p>d) Data processing should be available on the computer connected to the equipment as well. Software for deconvoluting the core and valance levels must be supplied. Open source softwares shall not be quoted and will not be considered. A video of deconvolution with an appropriate background on some test samples shall be submitted for technical evaluation.</p> <p>The link (on any of the drive/youtube/cloud/any other) shall be given in the technical document.</p>
11.	Multi-user operation	<p>a) The supplied system must include features for sample loading, sample handling,</p>	No change



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		vacuum control and data acquisition, allow the spectrometer to be operated in a multi-user environment. b) To meet these requirements the following functions shall be completely automated: vacuum control, gas handling, sample height adjustment, data acquisition, data interpretation, quantification, data reporting and system calibration.	
12.	Network capabilities	a) The instrument must have comprehensive remote diagnostics built into the hardware and software. b) The system must have an ability to be controlled remotely within an internal network or via the internet.	No change
13.	Computer hardware for controlling the system as well as data analysis	a) Desktop computer system with latest specifications should be provided. b) Hardware should be latest Windows based system with large LCD/LED screen preferably ≥ 23 ". c) Additionally, one licence and suitable computer with ≥ 23 inch LED/LCD monitor for the analysis software (full version) is required.	No change
14.	Baking	a) Automatic temperature control and automatic baking is required. In case, if the cables for the gauges/controller etc need to be detached, it should be clearly mentioned in the technical bid.	No change
15.	Calibration and alignment:	The instrument must include permanent standards and apertures as well as software to acquire and process the data. The instrument should offer auto calibration for the following functions: a) Energy scale linearity b) Transmission function c) Ion gun modes tuning and alignment d) Electron lens optimization e) Detector voltage optimization f) Span offset optimization	No change
16.	Protection and power requirement	The instrument must have a safety protection from damage at power fluctuation, vacuum and/or cooling water failure. The sockets and power rating shall be compatible with 240 V AC, 50 Hz.	No change
17.	Manuals	A complete instruction manual in English in electronic version must accompany the equipment. Description of all the functions and operations of that equipment must be included in the manual.	No change
18.	Pre installation requirement	Complete technical details of pre-installation requirements should be furnished along with the technical bid.	No change
19.	Installation, and Commissioning	Installation, complete interfacing of the system with its subsystems, and commissioning is to be carried out by the vendor's factory-trained engineers, followed by a demonstration of the system's performance.	No change



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20.	Training	Training at the installation site should be provided	No change
21.	Warranty	3 years comprehensive warranty from the date of commissioning.	No change
22.	User List etc	a) The supplier shall provide us the list of users and contact details in India and abroad. b) Bidder must also provide the number of service engineers available in the region of IIT Bhilai	No change
23.	Specification Support	All the above-mentioned specifications should be supported by authentic literature and printed brochures from the manufacturers only. At the time of technical bid, data on standard Ag and/or Au core-level must be supplied with intensity scale. We use this to measure signal to noise ratio (defined as the intensity of the peak divided by the secondary electron background at the same energy position). Similarly, data on standard PET must be supplied with intensity scale.	All the above-mentioned specifications should be supported by authentic literature and printed brochures from the manufacturers only. At the time of technical bid, data on standard Ag and/or Au core-level must be supplied with intensity scale. We use this to measure signal to noise ratio (defined as the intensity of the peak divided by the secondary electron background at the peak energy position). Similarly, data on standard PET must be supplied with intensity scale. S/N ratio should be 40 or better for PET sample. S/N should be 20 or better for Ag sample
24	UV Photoelectron Spectroscopy and work function measurements (complete set)	a) Vacuum ultraviolet source is required for work function and valance band measurements. The lamp should be compatible with He gas in He I and He II mode including H, Ne, Ar, Kr, Xe. Essential accessories for the same shall be supplied along with the main instrument. Two separate high precision gas admission valves for Helium I and Helium II. b) All differential pumping, gas handling should be software controlled so that it can be operated including depth profiles. c) The standard operation must be configured for use with helium, with the data system able to automatically start the lamp and operate in He(I) or He(II) modes. UPS performance and Fermi edge must be demonstrated on a clean Ag/Au sample to be 130 meV or better.	a) Vacuum ultraviolet source is required for work function and valance band measurements. The lamp should be compatible with He gas in He I and He II modes. The lamp and the power supply should be compatible to other gases such as Ne, Ar, Kr, Xe. Essential accessories for the same shall be supplied along with the main instrument. Two separate high precision gas admission valves for Helium I and Helium II.



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2. Revised installation duration:

Section II (b): Installation should be completed within 21 days from the date of supply or as per the instructions of IIT Bhilai, whichever is later.

3. Revised bid date:

S.No.	Details	Existing	To be read as
1	Bids Submission End Date	05-07-2023, 03:00 PM	23-07-2023, 03:00 PM
2	Bids Opening Date	06-07-2023, 03:30 PM	24-07-2023, 03:30 PM

Deputy Registrar

(Stores & Purchase)

IIT Bhilai

उप कुलसचिव

(भंडार एवं क्रय)

Deputy Registrar
(Stores & Purchase)

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