

Tender specifications for an XPS system

The proposed system must be able to characterize by X-ray photoelectron spectroscopy (XPS) all types of solid materials, whether insulating or conducting.

The equipment must be capable of achieving the following:

- The analysis of surface of all types, solid materials such as metals, semiconductors, polymers and also powders with the ability to quantify the various elements and obtain chemical information
- The ability to perform spectroscopy of features as low as 10 μm with sensitivity > 4 keps at 0.6 eV on a 10 μm spot.
- The ability to image and map the analysis areas for defects and chemical state distributions to 10 μm resolution.
- The ability to perform compucentric Zalar depth profile of inorganic films with an Ar^+ ion source for concentration of various elements and or chemical states, on all types of materials mentioned above, and the ability to maintain a constant charge neutralization condition at various interfaces.
- The ability to do multi-point depth profiles in parallel mode within a single sputter crater
- The ability to do ADXPS in an automated mode maintaining the exact position of the sample at all angles.
- The ability to incorporate a polyatomic C_{60} source for organic depth profiling using compucentric Zalar rotation and the capability to use both the polyatomic and Ar^+ ion guns alternatively or simultaneously.
- The ability to incorporate a hot/cold stage (-120 C to 500 C) option and to maintain all 5 axes functionality over the entire temperature range.
- Data processing on the computer connected to the equipment but also available on several desktop computers.
- The system must have to ability to be controlled remotely within an internal network or via the internet.

To achieve the above objectives, the following are mandatory requirements:

1. An intro chamber for rapid introduction of samples.
2. Analysis chamber with a 180 degrees hemispherical analyzer with a multichannel detector. The chamber must allow the incorporation other techniques in the analysis position such as AES or UPS. The system should be capable of achieving an ultimate base pressure of $6.7\text{E}-8\text{Pa}$ in the analysis chamber with no samples present.
3. The XPS system must have all electrostatic lenses. Electromagnetic input lens and magnetic immersion lens must not be used in the system.
4. A monochromated micro focused scanning $\text{AlK}\alpha$ X-ray source.
5. The diameter of the micro focused monochromated scanning X-ray beam must be user defined continuously from 10 μm to 300 μm .
6. The monochromated micro focused scanning X-ray beam must have the capability to scan the x-ray beam, of any specified diameter, on the sample to an area of 1000 μm x 1000 μm

7. The ultimate XPS energy resolution of < 0.50 eV FWHM for the peak of Ag 3d_{5/2}.
8. The following XPS count rate and energy resolution as a function of analysis area (FWHM of the peak of Ag 3d_{5/2}) must be met and demonstrated.

Mandatory Sensitivity	Size	Resolution (FWHM on Ag 3d_{5/2} peak)
> 4 kcps	<10.0 μm	<0.60 eV
> 12 kcps	<10.0 μm	<1.00 eV
> 15 kcps	<10.0 μm	<1.30 eV
> 15 kcps	<20.0 μm	<0.60 eV
> 45 kcps	<20.0 μm	<1.00 eV
> 60 kcps	<20.0 μm	<1.30 eV
Large Area Analysis:		
> 250 kcps		<0.60 eV
>1 Mcps		<1.00 eV

9. The analyzer obtains chemical state maps with a lateral resolution of less than or equal to 10 μm.
10. The system performs ADXPS in an automated mode, for multiple sample, maintaining the exact position of the sample at all angles.
11. The system must have an automated 5-axes sample stage/manipulator which is computer controlled with the ability to heat and cool the sample (-120C to 500C) with a hot cold stage option.
12. All 5 axes functionality of the sample stage must be maintained in the entire temperature range of -120C to 500C.
13. Sample stage movement must allow analysis of samples of different sizes up to 60 mm in diameter and thickness up to 7 mm.
14. Compucentric Zalar rotation capability at all temperature ranges is required.
15. The system should have a standard floating column Ar⁺ ion gun with neutral rejection and an energy range from 150eV to 5 kV for sputtering.
16. The same floating column Ar⁺ ion gun must also be able to provide low energy ions down to 5 eV for dual beam charge neutralization.
17. The floating column Ar⁺ ion gun must also be able switch between neutralization and sputtering under software control during depth profiling
18. The ion gun should be able to sputter large areas - up to 8 x 8 mm.
19. Software must be able to save different sputtering conditions for future use.
20. Supply of argon to be monitored by a thermal valve.
21. Maximum current of argon gun - not less than 5 μA at 5 kV.
22. The system must have to ability to incorporate a polyatomic C₆₀ ion gun, for depth profiling of polymers. The system must the ability to use the Ar⁺ ion gun and the C₆₀ gun alternatively or simultaneously.
23. Robust charge compensation using dual beam neutralization (electron and Ar ion beam) to analyze insulating materials.

24. Charge compensation should be software-controlled and one setting should work with all type of samples. Charge compensation should be done with low-energy electrons (<1.4 eV) and ions (<10 eV). The charge compensation protocol must characterize various sample in unattended operation without user intervention. Charge compensation must be demonstrated on the O-C=O 289 eV C 1s peak in PET to be < 0.85 eV
25. An optical camera and x-ray induced secondary electron imaging capabilities for the precise definition of the analysis position
26. Pumping system comprising of ion pump and Ti Sublimation pump with software controlled vacuum management.
27. A set of security features protecting the integrity of the vacuum system and the electronics in case of power failure.
28. A state of the art computer system to manage process and print the acquired analysis
29. The system must have the ability to be controlled remotely via an internal network or the internet.

To give the system a complementary functionality, the following options should be made available

1. Equipment needed to carry out ultra-violet photoelectron spectroscopy (UPS) analysis.
2. Equipment needed to carry out analysis Auger electron spectroscopy (AES).
3. A dual source non monochromated Al/Mg X-ray
4. UPS 15 KVA 1 an hour back up , input three phase, output single phase 240 Volt ,50 AMP .
5. One PC will come standard with XPS system, for PC & printer one table and chair will be provide by the vendor.
6. Laser jet color printer.
7. Including Standard warranty for 5 year from the date of installation.
8. 5 year operating the system from the date of installation.
9. After warranty please mentioned the 5 years AMC.
10. Spares for next 5 years offer optionally.

Please submit the techno-commercial quotation separately in sealed envelopes to the undersigned by March 22, 2013:

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