외 자 구 매 규 격 서

COMMODITY DESCRIPTION

품목 번호 Item No.	관세분류번호 HSK No.	정부물품분류번호(8자리) Korean Government Commodity Classification Code(eight-digit)	품 명 Description	단위 Unit	수량 Q'ty
1	9022.19.1000	**41115415 전자분광분석기**	**고성능 X-선 광전자 분광기** (High-perfomance X-ray Photoelectron Spectroscopy)	system	1

Model : NEXSA G2

I. 용 도 End-user's Use

1. High performance XPS system for surface analysis techniques.
2. The system should be supplied for below facilities :
   1) Micro-foucssed Monochromated XPS
   2) ARXPS (Angle Resolved XPS)
   3) XPS Image
   4) Small area XPS
   5) Windows 10 O.S based Data system
   6) The system should be fully automated from sample loading to report generation.
3. All the materials used in the construction of vacuum system are UHV compatible, low vapor pressure materials with mu-metal shielded.
4. All the weldings are tungsten inert gas welding, all the chamber and connecting walls should be chemically clean to minimize outgas.
5. The system is bakeable up to 100 C .
6. Electric supply : 220vac, 60Hz, Single phase
7. Automatic Calibration and alignment always available by data system.

Ⅱ. 장비의 구성(Configurations of Goods)

1. 주장비
   1) Electron Energy Analyser with lens system 1 set
   2) Microfocussed Monochromated X-ray source 1 set
   3) UHV analysis chamber 1 set
   4) Mono-atomic and cluster ion source 1 set
   5) FEAL Chamber & Complete UHV pumping system 1 set
   6) High precision manipulator 1 set
   7) Data system software 1 set
   8) Bench and Bakeout facility 1 set
   9) UV PHOTOELECTRON SPECTROSCOPY (UPS) 1 set
   10) REFLECTED ENERGY ELECTRON LOSS SPECTROSCOPY 1 set
   11) ION SCATTERING SPECTROSCOPY (ISS) 1 set
   12) Sample Viewing facility 1 set

2. 부대장비

13) Water chiller 1 set

14) Enhanced consumable pack 1 set

15) Vacuum Transfer Module 1 set

III. 규 격 (Performance and Specification)

1. Electron analyser with Lens system

1) Type : Spherical sector analyser

2) Mean diameter : 250mm

3) Operation mode : CAE

4) Min. energy step size : 3 meV

5) Ultimate Energy resolution (of Ag 3d5/2 peak) : <0.5eV FWHM

6) Ultimate spatial resolution : < 10μm,

7) XPS on Insulators : C 1s energy resolution (eV) : <0.85eV

8) Pass Energy : 1 - 400 eV continuously selectable

9) Analyser Housing : Mu-metal shielded or equivalent

10) Detector : 128-channel detector

11) Max. Sensitivity at 1eV FWHM on Ag3d5, @ 400 μm, 120W : 6,500,000 cps,

12) Max. Sensitivity at 1eV FWHM on Ag3d5, at 10 μm, : 75,000 cps,

2. Microfocussed Monochromated X-ray source

1) Anode material : Al anode

2) Type : Microfocussed Monochromator

3) Crystal alignment : by Computer controlled

4) Source cooling : water cooling

5) Safety inter lock : High voltage, coolant, Vacuum pressure & mechanical interlocks

6) Data system control of all X-ray source parameters

7) Rowland circle : 250mm

8) Max. Power : 120 Watt,

3. UHV Analysis chamber

1) Material : UHV compatible chamber

2) Ultimate vacuum : 5×10-9mbar,

3)Pumping system :

Titanium Sublimation Pump

Turbo-molecular pump : 260 l/s

Rotary backing pump

4. Mono-atomic and cluster ion source

1) Energy range :

Monoatomic Mode : 0.5keV to 4keV,

Cluster Mode : 2keV to 8keV,

2) Max. beam current :

Monoatomic Mode : >1.4 μA at 500eV, 1000μm,

Monoatomic Mode : >2.7 μA at 4 keV, 500μm,
Cluster Mode : >7 nA at 4 keV, 700μm at 4KV,
Cluster Mode : >10 nA at 4 keV, 700μm at 8KV,

3) Cluster size range : 75 ~ 2000 atoms per clusteror,
4) Type : Operation in both cluster and monoatomic ion modes
5) Chamber pressure ; Typically better than 5 × 10-7mbar
6) Gases used : Ar,
7) 70 l/s turbomolecular pump for source differential pumping

5. Fast entry chamber with transfer mechanism
1) Material : UHV compatible stainless steel
2) Complete with sample transfer mechanism and vacuum gauges
3) 260 l/s Turbo-molecular pump
4) Automated specimen transfer mechanism controlled from data system

6. High precision manipulator
1)High precision, automated specimen stage with internal stepper motors
2) Maximum specimen dimensions : 60 x 60 x 20 mm
3) Multi-specimen mounting plates : two
4) Mounting plate for powder samples : One
5) Rotation holders : One set of three
6). Sample Tilt : +, - 90 degree

7. Data system software and interface
1) Operating System : Windows based O.S
2) Data system software
<EXPERIMENT DEFINITION>
LIBRARIES
SPECTRUM ACQUISITION
- Full computer control of all acquisition parameters.
- Multiple spectrum regions may be defined, each having individualof energy range, pass energy/retard ratio, step size, dwell time and number of scans. This allows survey and narrow scans within asingle experiment.
- Scanned spectra may be acquired.
- Signal averaging
- Multiplexing of multiple spectrum regions

DEPTH PROFILES
- Multiple etch phases for extended information at interfaces.
- Generate quantified depth profiles during acquisition.

EXPERIMENT PROCESSING
Enables processing operations to be included as part of the experimental procedure. This allows automated processing and quantification and can be combined with automated copying and pasting into other documents e.g. spreadsheets

<INSTRUMENTCONTROL>

Calibration and alignment of sources, analyser and detector shoul be possible by data system

SPECTROMETER
- Control and optimisation of analyser and lens settings
- Detector voltage

ION GUN
- Control of ion gun beam blanking
- Display of absorbed current image for ion gun alignment (where option is installed)

X-RAY SOURCE
- Computer control of spot size/power
- Setup and diagnostic facility

LIVE DATA DISPLAY AND PROCESSING
- Live (acquiring) data may be displayed in real time.
- Live data may also be viewed in a Processing window, providing accessto processing tools, for example :
  Live cursor readout of peak energy and counts
  Compare with previously acquired spectra
  Peak find and ID
  Zoom
  Annotation
  Display montage of a depth profile during acquisition
  Calculation and display of a profile during acquisition
  Comparison with previously acquired data

<DATA PROCESSING>
- DATA OUTPUT
  Data may be printed or copied to the Windows clipboard for pasting into other software packages as pictures or data. Data within a processing document may be saved, together with intermediate stages of processing. Processing operations are recorded in an audit trail with the data.
- ANNOTATION
  Annotate image in user selectable fonts and styles

<SPECTRUM PROCESSING>
- Processing operations include
- Spectrum analysis
- Spectrum modification
- Profile processing
- Overlay / Comparison
- Non-Linear Least Squares Fitting and Target Factor Analysis

<ARXPS (Angle Resolved XPS) SOFTWARE FOR Ultra thin film analysis>
- professional ARXPS softwarer package : calculate layer thickness & quantification

3) Hardware

Computer : CPU Intel Core i5-12500 3.00G 18MB 6 cores
RAM : 32GB (2X16GB) DDR5 4800MHz UDIMM
On chip Intel Graphics
Internal M.2 Storage 1 TB Pcle SSD M.2 Drive
Dual Port 1GbE NIC
Optical drive 9.5mm DVD-ROM
24" LCD Color Monitor
Mouse and keyboard

8. System Bench and Bakeout facility

1) System Bench : Heavy duty steel bench
2) Bakeout facility : without disconnecting cables etc., By heating tapes

9. UV PHOTOELECTRON SPECTROSCOPY (UPS)

1) HIGH INTENSITY UV LAMP WITH AUTOMATED TWO-STAGE DIFFERENTIAL PUMPING
2) Automated differential pumping shut-off valves
3) Two separate high precision gas admission valves for Helium I / Helium II
4) UV lamp power supply
5) datasystem control interface
6) SENSITIVITY in the Ag 4d peak at 120 meV energy resolution : 2,000,000 CPS

10. REFLECTED ENERGY ELECTRON LOSS SPECTROSCOPY

1) Type : dual-beam low energy electron / ion source
2) Electron beam energy : 0 - 1,000 eV (REELS mode)
3) Electron beam emission : 250 μA
4) Useable gases for ion flood : Inert gases. Argon is recommended.
5) SENSITIVITY in the Ag at 0.5 eV FWHM : 1,000,000 CPS

11. ION SCATTERING SPECTROSCOPY (ISS)

1) Operation Mode : Constant Analyser Energy (CAE)
2) Energy range : 0 - 3,000 eV (bi-polar for ions or electrons)
3) Min. energy step size : 3 meV
4) SENSITIVITY in the Au at 14 eV FWHM : 25,000 cps/nA

12. Sample viewing facility : total 3 CCD

Platter View : As the sample holder is being loaded into the instrument, an image of the whole platter is recorded automatically. This image is used to navigate between the samples mounted on the holder.

Reflex Optics View : This is a live, high-magnification view of the analysis position. It is used to align features on the sample with the analysis position.

Height Setting View : This is a live, high-magnification view of the analysis position. It is used to ensure that the sample is at the correct working distance from the photoelectron transfer lens

13. Water chiller

1) cooling capacity : 1000 W @ 20℃
2) Include temperature regulator and flow control unit

14. Spares package : 1 set
    X-ray anode kit x 1
    Emitter kit or filament kit x 1
    Flood gun filament kit x 1
    GCIB filament kit x 1
    Channel plate x 1
    Sublimation pump filaments x 1
    General seal set x 1

15. Vacuum Transfer Module
1) Sample holder allowing samples to be transferred under vacuum into the system
2) Maximum specimen thickness 9 mm using this module

Ⅳ. 관련법령에 따른 필수 면허·자격 사항(Compulsory Licenses and Qulifications required by relevant laws or regulations) : yes

V. Remarks

1. Installation and test run by the qualified engineer shall be performed.
2. Warranty : 1 year after installation, Labor & Parts (excluding consumables)
3. Delivery : within 4 months after open the L/C
4. Training : operation training after installation