

Phi XPS VersaProbe III

with metal-deposition and Ar-ion gun

Highly automated, high energy resolution XPS instrument that uses a scanned, focused, monochromatic x-ray beam specifically designed for spatially resolved chemical state analysis. Beam rastering allows the acquisition of secondary electron images and XPS data from identical points. The unique multi-channel detector and fast electronics allow rapid data collection and maximum sensitivity for scanned and un-scanned modes.



Specifications:

Gas Cluster Ion Source (GCIB)

2.5 to 20 kV Ar GCIB Ion Gun for low damage surface cleaning and fast depth profiling of many polymer materials
Wien filter for cluster size selection of up to Ar₅₀₀₀
Two-stage differential turbo-molecular pumping with two turbo-molecular pumps and two rotary backing pumps

UPS Source

Windowless high intensity bankable discharge source
Complete two stage differential pumping with dedicated turbo molecular pump and two rotary pumps
Can produce He I and He II photons

Scanning Auger option

<100 nm electron beam diameter (<150 nm if Gas Cluster Ion Source and or Turbopump option are selected)
Scanning secondary electron detection and imaging
Scanning Auger spectra, images, line scans, depth profiles and maps

Ambient options

Stage: 4 contacts with holder for *in situ* battery experiments (maintained using compucentric Zalar rotation™ and compucentric tilt)
Deposition: 4 contact ambient sample holder for *in situ* deposition
Holder: 4 contacts ambient holder for samples

Vacuum transfer Vessels

25 mm (compatible with 25 mm sample mounts)
60 mm (compatible with 25 and 60 mm diameter sample mounts, and with a 4 contacts ambient holder)

Warranty

Maintenance visits, emergency visits, spare parts, guaranteed 2 day response time

Spark Plasma Sintering equipment (HP D 10-GB) *in glovebox (2 arms + 4 arms) with water chiller*

SPS system for consolidation of various powdery raw materials using uniaxial pressing force and heating by direct current supply (DC impulses). The preparation of the material is carried out in a glovebox connected to the HP D 10 system as upstream equipment with oxygen-free, dehumidified atmosphere. The loading of the HP D 10 is also carried out via the connected glovebox. The whole process can be run under vacuum as well as under inert atmosphere (N₂, Ar). The concept of this FAST equipment was designed to meet the special requirements for the research and development of metal and ceramic materials but also for Composites, functionally graded materials (FGMs), hard metals and especially “Nano Materials” up to temperatures of 2400°C.



Specifications:

Vessel

Stainless steel, double-walled. Completely water cooled
Chamber and press cylinder are integrated in pressing frame

Heating system

Inverter gives impulses that can be freely programmed via control
High capacity transformer, water-cooled
Pulse ON and OFF times freely programmable (1...25 ms)

Pressing system

Hydraulics aggregate incl. oil cooler and servo valves, brand Bosch-Rexroth incl. integrated control (HNC)
Piston stroke: 0...100 mm
Pressing force: 3...100 kN
Max. speed pressing punches: 2 mm/s
Displacement transducer, absolute and relative path, ds/dt signal 0-100 mm/min., accuracy 3 µm

Temperature measurement

1 piece pyrometer (type IGA6, measuring range 250... 2500°C) mounted in axial direction
2 pieces thermocouple type K for temperature control of the pressing punches on the surface, implication in the process control (alarm)
1 pieces thermocouple type K for flexible arrangement on the mould for temperature control and measurement

Vacuum, gas system

2 stage rotary vane vacuum pump type D8B, Leylod brand
Vacuum in cold, clean furnace: 5×10^{-1} mbar
Leakage rate: $< 1 \times 10^{-2}$ mbar 1/s
Working gases: Ar, N₂, He
Operating modes: vacuum full / relative pressure control 20...60 mbar

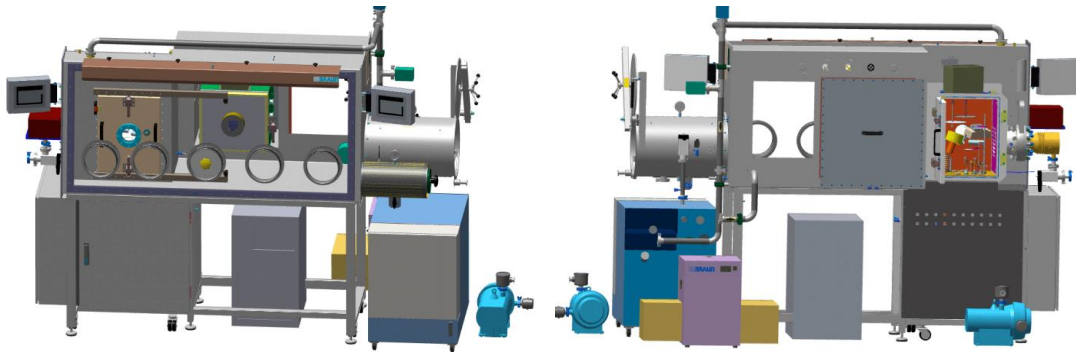
Warranty

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PVD Glovebox (5 arms)

with Li/Na-evaporator and plasma cleaner

The MB-ProVap-36 with cubical high vacuum chamber is fully integrated into MBraun inert gas glovebox system. This versatile research and development tool that is fundamental for accurate and controlled thin film deposition and the fabrication of full and half cells under vacuum conditions. The rectangular chamber design also offers additional pump configurations such as more powerful turbo-molecular and cryo-pumps. The bespoke bell jar system DIENER –TETRA 22 plasma cleaner allows the removal of organic matter from surfaces.



Specifications

Vacuum Chamber Specifications

Inner dimension: 380 x 380 x 500 mm, 72 L volume

2 door access with manual closing mechanism

Stainless-steel liners as protection shielding for easy removal and cleaning on chamber/doors

Basic flange with 14 high vacuum feedthroughs and high vacuum flange

Deposition Controller

4 QCM Sensor input

Measurement/Update rate: 1 to 10 Hz

Rate display resolution: 0.01 Angstrom/sec, Thickness display resolution: 0.001 kAngstrom

Processes: 100 processes, 1000 layers, 50 films, 4 co-deposited films

Height adjustable electro-pneumatic baffle for unintended material deposition onto substrate

Evaporation Technology

Temperature controlled organic evaporation

Round Magnetron sputter source

RF, DC or DC Pulsed power modes

For bonded, clamped, or direct water-cooled targets

Substrate

For substrates up to 105 x 105 mm or 153 mm wafers

Heated/cooled substrate holder with rectangular coating chamber

Adjustable substrate rotation speed, up to 33 RPM

Pre-treatment: Integrated quartz lamp heaters, 500W lamp, up to 200°C

Ultimate vacuum

Down to: < 2x10⁻⁶ mbar (@ 230 l/s turbo molecular vacuum pump)

< 9x10⁻⁷ mbar (@ 560 l/s turbo molecular vacuum pump)

Plasma Cleaner

Vacuum Chamber inner dimension 305 x 305 x 250 mm, 22 L volume

Pneumatic lift allows easy loading and unloading of samples

Pirani sensor pressure measurement

Environmental Glovebox (5 arms)

with 3 independent chambers

Glovebox with ovens and high precision presses for isostatic electrochemical characterization at different temperatures.



Specifications

Glovebox

Standard Single sided 4 arm glove box with main antechamber (right)
Mini antechamber oven up to 150°C, installed on right side wall (150 diameter x 400 mm length)
Dimensions workspace 1800 x 900 x 780 mm
Lighting (front side)
Gas purification system for closed cycle circulation Removal: oxygen and moisture, <1 ppm
Sensor-Set: H₂O and O₂
Molecular sieve solvent purifier inline and bypass operation modes
10 banana fitted plugs
Quick purge
16 feed through flanges
Temp settings by means of a standalone controller (PID settings)

Temperature test chambers (Small)

2 x small stainless steel test chambers: inside approx. 300 x 500 x 350 mm
Temp range: -20°C up to 100°C
Removable shelf plate in middle of chamber (stackable shelves)
Temp control by external bath cooling system (Si oil) with integrated control unit
Temp fluctuation +/- 0.3 K
Fan integrated into chamber door to generate high temperature uniformity inside

Temperature test chamber (Tall)

Stainless steel, inner dimensions approx. 700 x 500 x 350 mm
Temp range: -20°C to 100°C
Sliding door
Temp control by external bath cooling system (Si oil) with integrated control unit

Mechanical Testing Glovebox (4 arms)

Low force testing

MBraun glovebox equipped with an electrochemical-mechanical probe station for testing the mechanical properties of interfaces, symmetric cells and whole cells. This system offers real-time auto tuning of control parameters, based on measured test force and strain data. Safely make comparisons to unknown sample data without the need for preliminary tests. In addition, the autotuning function easily performs strain control, an ISO 6892-2009 requirement. Cutting edge software that allows: data to be obtained rapidly, easy entry of method settings, high efficiency, continuous testing using fast data searches and the generation of detailed reports.



Specifications:

Vacuum chamber

Dimensions workspace 1800 x 1800 x 780 mm
Main antechamber (right). Diameter 390 mm
Standard mini antechamber (right) . Dimensions: 150 mm, length 400 mm
Front side lighting
6 pcs shelves mounted at back, height adjustable

Gas purification system

For closed cycle circulation. Removal: oxygen and moisture, <1 ppm.
H₂O sensor: moisture probe, PLC controlled, measurement range: 0 – 500 ppm, transducer, 0 – 10 V output.
O₂ sensor: oxygen probe, PLC controlled, measurement range: 0 – 1000 ppm, transducer, solid state device, 0 – 10 V output

Mechanical

Table top model (AGS-50kNX) W718 x D641 x H1633 mm, 260 kg
Max load capacity 50 kN

Force measurement

High precision (Within $\pm 0.5\%$ indicated test force (at 1/500 to 1/1 load cell rating)
Standard precision: Within $\pm 1\%$ indicated test force (at 1/500 to 1/1 load cell rating)
Calibration: Automatic test force calibration: select tensile, compression, or tensile and compression
Cross head speed range: 0.001 to 800 mm/min (stepless), accuracy: $\pm 0.1\%$
Crosshead table distance: 1210 mm
Data Capture Rate: 1000 Hz max.

Automatic standard functions

Reading of load cell characteristic values
Test force, stress, stroke and position displays
Stress control (autotuning)
Test force autocalibration
Auto zeroing.
Load cell overload detection

XRD upgrades

2D detector and XY-stage

These upgrades to an existing 9kW powder diffractometer improve throughput and resolution.



Specifications:

HyPix – 3000 SL Retrofit

Base - unit, PC server, FG card, Cables,
Horizontal holder for Smartlab, mapping optics,
Incident sollar slit open, alumina powder,
Electric cable, SLG V3 Upgrade,
SL power modification (350W power mounting).

X - Y stage 4inch (X,Y +/- 50mm)

X axis adjustment range = - 50 mm to +50 mm

(Minimum step size: 0.001 mm)

Y axis adjustment range = -50 mm to +50 mm

(Minimum step size: 0.001mm)

Applicable within the range of X Y 50 mm

Micro - focus Optics Unit CBO- f

Method: Point focusing the line parallel beam from parabolic multilayer x - ray mirror by polycapillary method

Irradiation diameter at sample position: Approx. Diameter 0.4mm when irradiated vertically

Sample observation camera (STD)

Magnification ratio: X15, capture area : X23mm x Y 17mm