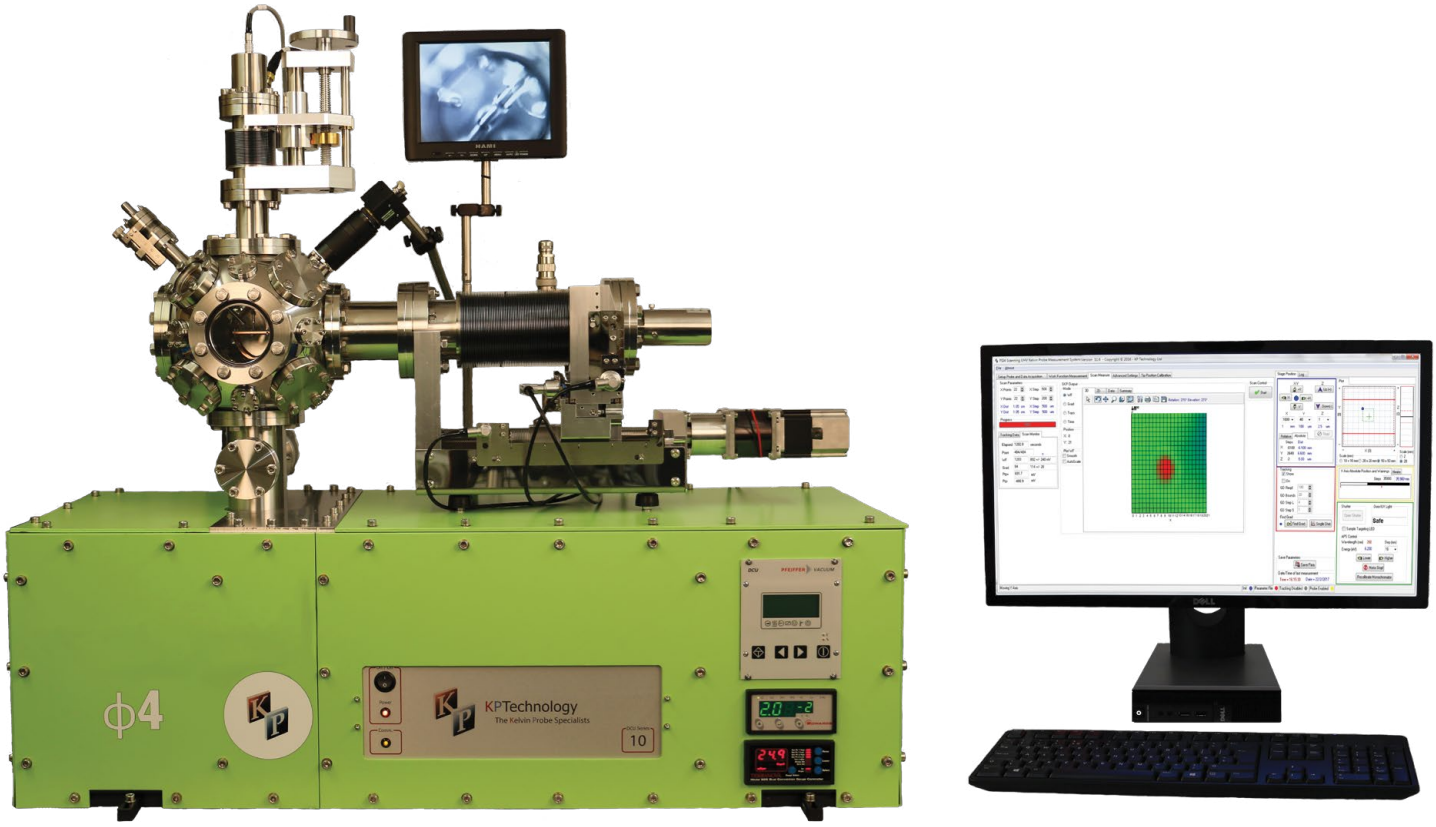
UHV Kelvin Probe Systems

Φ4

System Description

Our Φ4 Ultra-high Vacuum Scanning Kelvin Probe system gives the user full access to work function (Φ) or Volta potential (Δψ) measurements under vacuum with the ability to alter the temperature from 77 K to 860 K. The Kelvin probe measurement has resolution of 1-3 meV for a 2 mm tip on a conducting sample. The sample is mounted on a plate that is located on a motorized (x, y, z) translator attached to a stainless steel vacuum chamber. Φ4 also comes with a photoemission spectroscopy system with a tunable source (3.4 - 7.0 eV). The deep ultra-violet (DUV) light spot measures approximately 3 x 4 mm. Absolute work function measurements can be obtained with this system in the range of 4.0 - 6.5 eV with an accuracy of 0.05 - 0.1 eV.

The system can be upgraded with Surface Photovoltage Spectroscopy through utilising other ports in the system chamber. Liquid nitrogen is used as the method of cooling the sample and heating is achieved by controllable direct current . Nitrogen gas is used to displace the oxygen to facilitate the use of the photoemission system source. An optical breadboard is used to support the chamber and standard power is required for operation.



Φ4 Ultra-high Vacuum Kelvin Probe system with ambient pressure photoemission and surface photovoltage spectroscopy, heating, cooling and scanning capabilities

Features

- Work function measurement by Kelvin probe
- Work function resolution of 1-3 meV
- UHV, gas or ambient measuring
- Absolute work function measurements
- Heating and cooling from 77 K - 860 K
- Options of SPV or SPS

Applications

- Organic and non-organic semiconductors
- Metals/metal oxides/metal alloys
- Thin films
- Solar cells and organic photovoltaics
- Corrosion
- Diamond electronics

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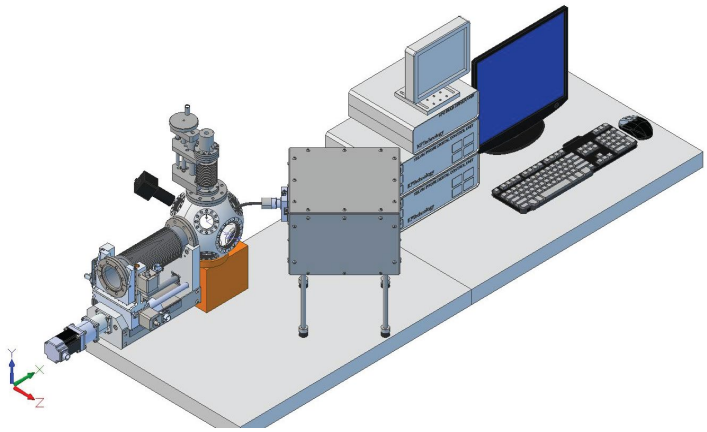
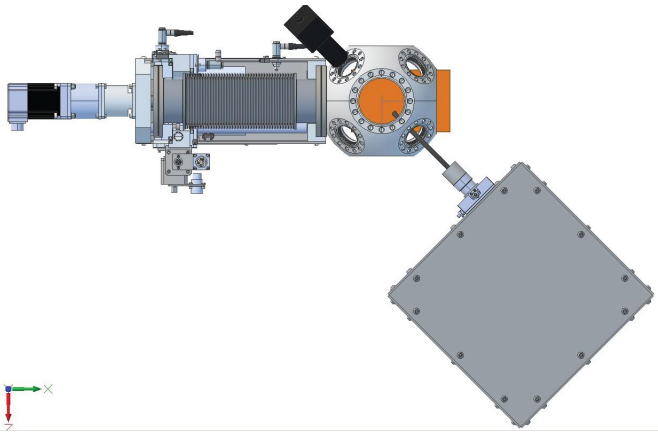
System Specifications	Φ4
Tip material/diameter	2 mm / 4mm / 10mm stainless steel tip
Work function resolution	1-3 meV
Manual translation	100 mm manual translator
Scan control	Automatic, via user interface - 20 x 20 mm
Sample stage	UHV compatible 3-axis motorised stage
Visualisation	3D maps of surface potential and sample topography
Oscilloscope	Digital TFT oscilloscope for real time signal
Pump	Turbo-molecular pump backed by rotary pump
Energy range (APS/SPS)	3.4 - 7.0 eV / 1.24 - 3.10 eV
Detection system	Off-null with parasitic capacity rejection
Mounting geometry	Normal to sample surface
Mounting port	DN40 / CF70 (2.75 inch) OD
Vacuum compatibility	$1x10^{-9}$ mBar
Flange to sample distance	User defined
UHV cell	DN63 spherical chamber (Kimball Physics)
Warranty	12 months



Technical drawing showing full layout of 4 system including light source,camera, control units and PC. Turbo-molecular pump not visible but attaches to base of system



Plan view showing motorized sample stage, spherical chamber and light source at 45°

The Company

KP Technology Ltd was founded with the aim of bringing to the market new surface research tools. These tools have featured in over 250 peer-reviewed client publications in the last 3 years. KP Technology Ltd also performs a significant amount of material research and training consultancy, mostly based upon the work function (Φ) or surface potential evaluation of client samples. KP Technology Ltd holds international patents on their Ambient Pressure Photoemission Spectroscopy (APS) system for measuring absolute workfunction. Along with a strong research and development division and over 500 systems shipped worldwide, this has placed KP Technology Ltd as the leading supplier of Kelvin probes in the world.

Contact

For quotation requests, further information or to discuss any research or particular measurements, please feel free to contact us:

Email: sales@kelvinprobe.com
Tel: +44 1955 602 777

Or visit our websites
www.kelvinprobe.com
www.airphotoemission.com

KP Technology Ltd is the proud winner of the Queens Award for Enterprise: International Trade 2013