PHYSICAL ELECTRONICS

PHI 5000

VersaProbe

Scanning ESCA Microprobe

Presenting the PHI 5000 *VersaProbe*

A VERSATILE MULTI-TECHNIQUE PLATFORM FOR HIGH PERFORMANCE XPS

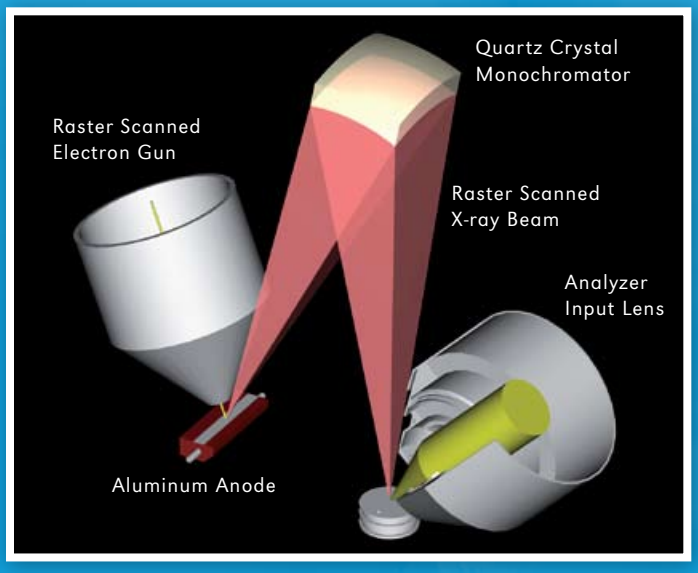
The PHI 5000 *VersaProbe* is a multi-technique surface analysis instrument based on PHI's highly successful scanning x-ray microprobe technology. This technology provides high performance micro-area spectroscopy, chemical imaging, and secondary electron imaging with a raster scanned 10 µm diameter x-ray beam. The x-ray beam size can be computer controlled from less than 10 µm diameter to 100 µm diameter for high sensitivity.

PHI's patented dual beam charge neutralization method provides effortless analysis of insulating samples using a combination of low energy ions and electrons.

The integral floating column argon ion gun provides an impressive sputter depth profiling capability for inorganic thin film structures. The optional C_{60} ion gun provides a unique and powerful sputter depth profiling capability for many organic materials.

A fully automated five axis sample manipulator facilitates the automatic analysis of multiple samples and provides Zalar Rotation™ capabilities for argon or optional C_{60} sputter depth profiling.

PHI *SUMMITT*, the software user interface for the *VersaProbe* provides an easy-to-use platform for multi-technique instrument control. Data interpretation and manipulation is performed with *MultiPak*, PHI's advanced electron spectroscopy data reduction software package.

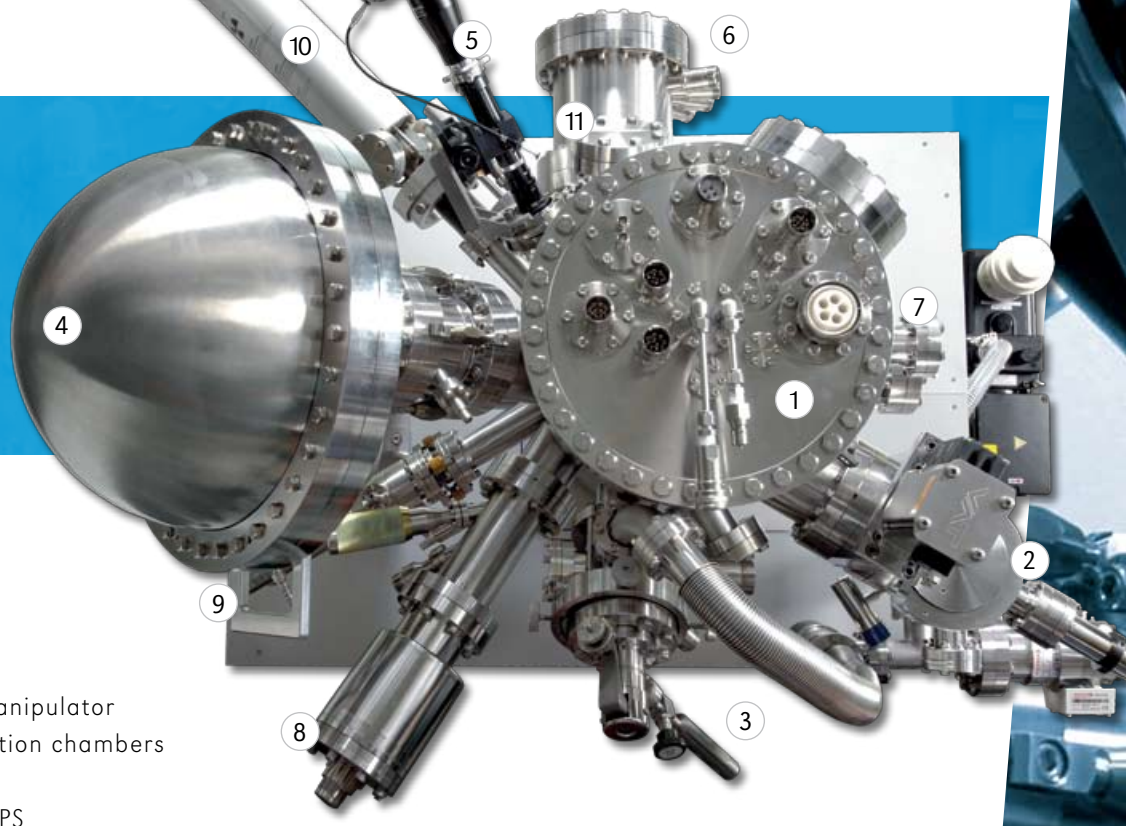


PHI Scanning X-ray Microprobe Technology

ADVANCED FEATURES

- **PHI's patented x-ray microprobe technology and high sensitivity spectrometer** provide high performance micro-area spectroscopy and imaging
- **Secondary electron and chemical imaging**
- **High sensitivity** micro-area spectroscopy
- **High performance** thin film analysis
- **Versatile** multi-technique platform

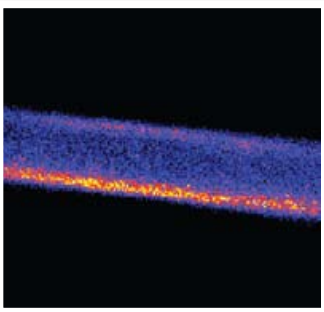
Versatile Test Chamber Configuration



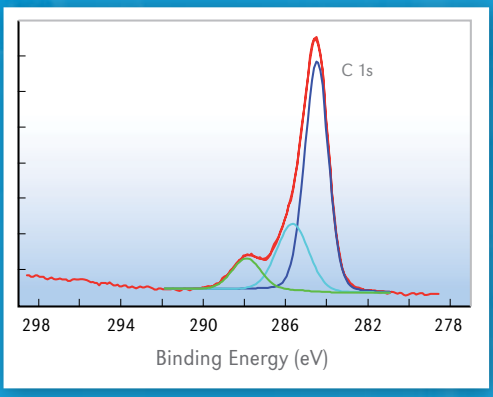
1. Scanning x-ray source
2. Sample introduction chamber
3. Argon sputter ion gun
4. Electron energy analyzer
5. Optical microscope
6. Five axis automated sample manipulator
7. Optional UHV sample preparation chambers
8. Optional C_{60} sputter ion gun
9. Optional UV light source for UPS
10. Optional dual anode x-ray source
11. Optional electron gun for AES

OPTIONAL C_{60} ION SOURCE

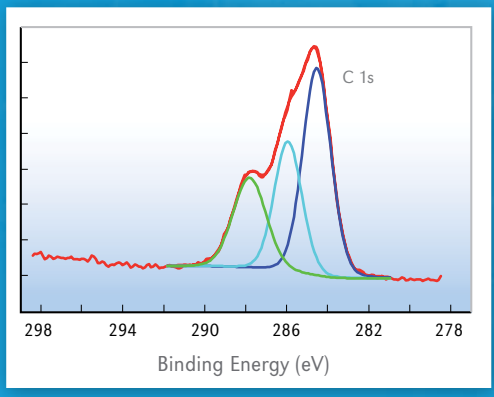
- Remove surface contamination
- Perform organic thin film analysis
- Preserve chemical state information



X-ray beam induced secondary electron image (SXI) of an 80 µm diameter human hair



Surface of Human Hair



5 nm Removed from Human Hair

Spectra obtained from a 20 µm area on a human hair (SXI shown above) before and after C_{60} sputtering. The hydrophobic surface was removed revealing the underlying hydrophilic chemistry. Using C_{60} ions the carbon chemistry was preserved. With traditional argon ion sputtering the chemistry would have been destroyed.

PHYSICAL ELECTRONICS

VersaProbe's Capabilities

STANDARD

- Raster scanned, micro-focused x-ray beam
- X-ray induced secondary electron imaging
- Dual beam charge neutralization
- Macro-area XPS
- Micro-area XPS
- Chemical state imaging
- Angle dependent XPS
- Floating column argon ion gun
- Zalar Rotation
- Five axis automated sample manipulator
- 25 mm and 60 mm sample handling

OPTIONS

- 10 keV C_{60} ion gun
- Dual anode, non-monochromatic x-ray source
- UV light source
- 95 mm sample handling
- Hot / cold sample handling

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