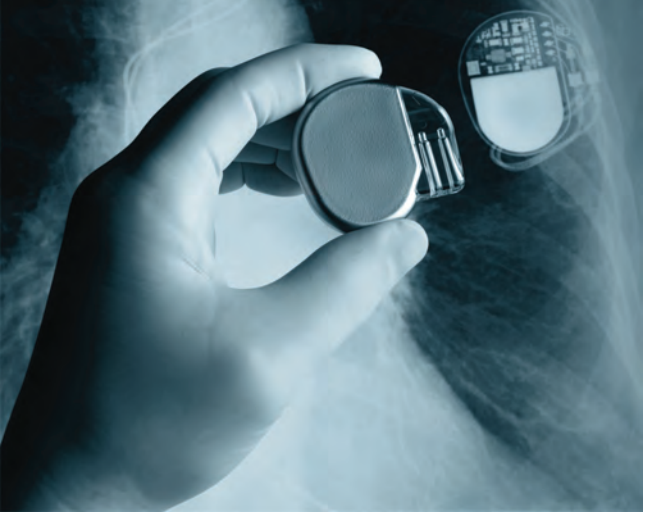
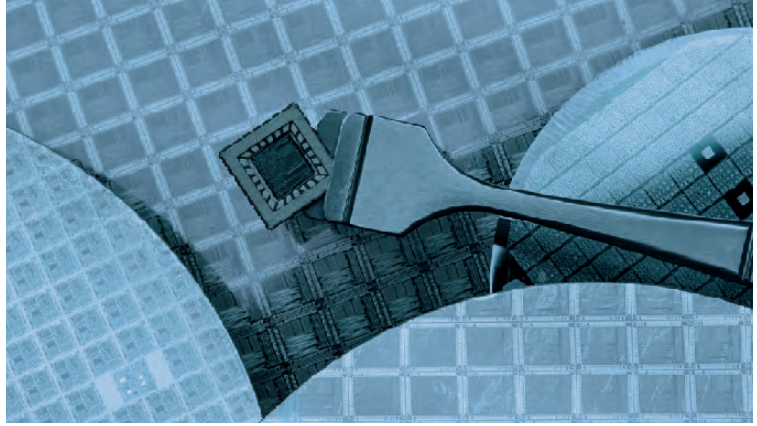
PHYSICAL ELECTRONICS
A DIVISION OF ULVAC-PHI

PHI *Quantera* II

Scanning XPS Microprobe



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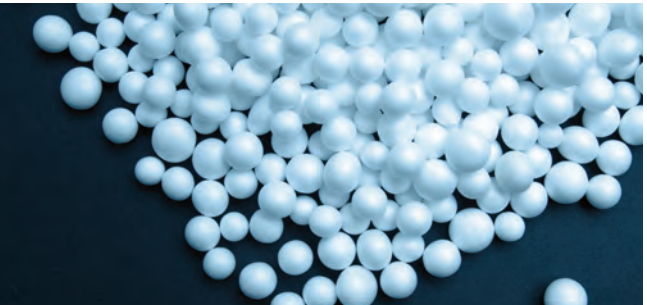


PHI *Quantera* II

Scanning XPS Microprobe

X-ray Photoelectron Spectroscopy (XPS/ESCA) is the most widely used surface analysis technique and has many well established industrial and research applications. XPS provides quantitative elemental and chemical state information from surfaces and thin film structures. XPS is applied to a diverse range of materials applications including: polymers, metals, catalysts, thin films, photovoltaics, batteries, wear coatings, nanomaterials, semiconductor devices, magnetic storage media, display technology, and biomedical devices.

The *Quantera* II is built upon Physical Electronics' (PHI) revolutionary scanning XPS microprobe instrument platform that includes: a patented micro-focused scanning x-ray source, patented dual beam charge neutralization technology, a floating column ion gun for optimized XPS sputter depth profiling, flexible robotic sample handling, and a fully automated internet ready instrument platform. The *Quantera* II increases the performance and productivity of these revolutionary technologies, providing the highest performance XPS system available to meet your current and future XPS needs.

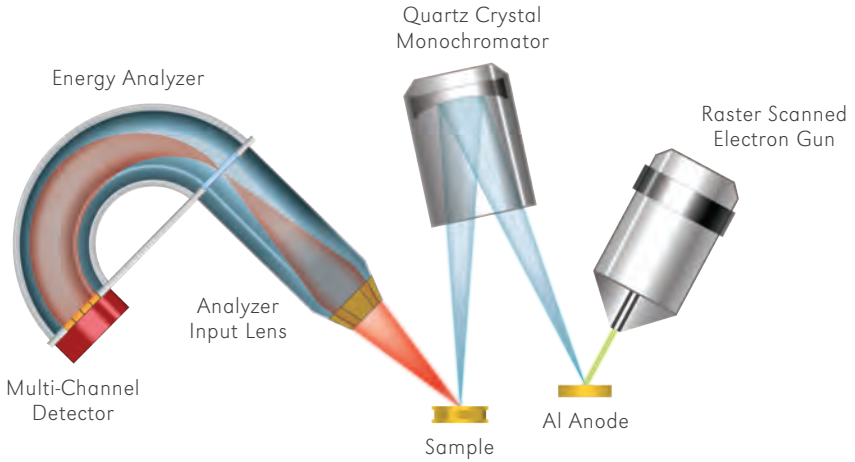
THE SCANNING XPS MICROPROBE ADVANTAGE

Unique Capabilities

PHI's scanning XPS microprobe instrument platform provides secondary electron images (SXI) generated by scanning a focused 10 µm x-ray beam across the sample. These SXI images have a contrast mechanism that is dominated by photoelectron yield (composition), and therefore often reveal features that are not visible optically or related to topography.

SXI images provide a high degree of confidence in locating small features for analysis.

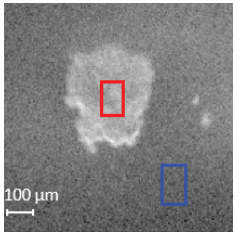
The micro-focused x-ray beam defines the analysis area pattern for large area spectroscopy, micro area spectroscopy, chemical state imaging, and depth profiling.



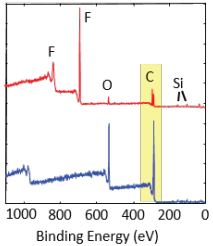
PHI's patented scanning XPS microprobe technology delivers a micro-focused, raster scanned, monochromatic x-ray beam to the sample surface providing unique and powerful capabilities to our users.

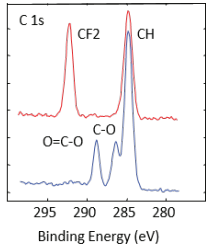
MICRO AREA XPS

SXI



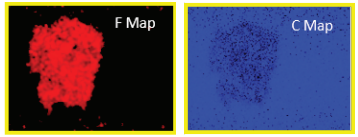
Multi-Area Spectroscopy



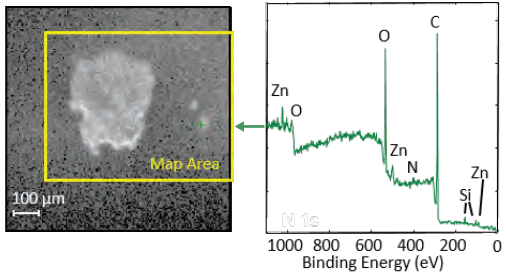


X-ray beam induced secondary electron image (SXI) from a polymer film reveals the presence of unexpected contaminants on the samples surface. Micro area spectra reveal the composition of the unknown contaminants.

Chemical Imaging



Elemental images show the smaller features in the secondary electron image do not contain fluorine.



A micro area spectrum from the smaller features, obtained using a 10 µm diameter x-ray beam, identifies the presence of a second contaminant that contains Zn.

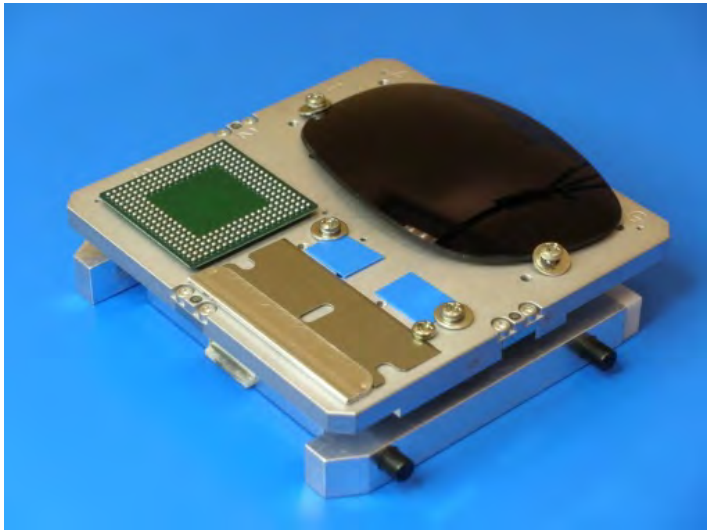
Microprobe Workflow

A x-ray beam induced secondary electron image immediately revealed the presence of unexpected localized contaminants on a polymers surface. Micro area spectra obtained with a 20 µm diameter x-ray beam identified a fluorocarbon contaminant in a few minutes. Elemental maps show the smaller features in the secondary electron image do not contain fluorine. A micro area spectrum from the smaller features, obtained using a 10 µm diameter x-ray beam, identifies the presence of a second contaminant that contains Zn.

ROBUST AUTO ANALYSIS

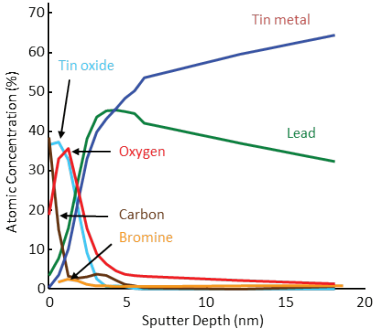
High Productivity

Whether you are analyzing a thin polymer sheet, a large plastic lens, a steel razor blade, or electrically isolated solder bumps; the instrument set-up is the same. Point and click at an optical image to select the analysis areas. Then start the analysis with the dual beam neutralizer and the auto-Z functions activated to provide automatic sample alignment and charge neutralization. There is no individual sample tuning, no concerns over sample composition and size, and no worries about walking away from the instrument and letting it automatically collect data from all your samples.

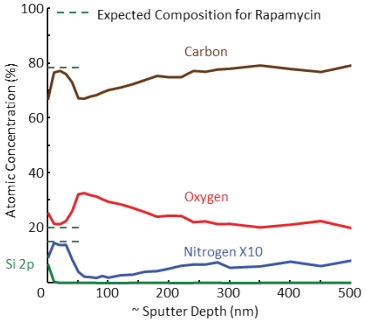


- No Special Sample Mounting or Masking
- Robust Automatic Sample Alignment (“Auto-Z”)
- Hands-Off Charge Neutralization

THIN FILM ANALYSIS



2 keV Ar sputter depth profile of the surface species on a solder ball used for semiconductor packaging



10 keV C_{60} depth profile of a 50/50 rapamycin and PLGA film showing segregation of the rapamycin to the surface of the coating.

Inorganic Thin Film Analysis

- 0-5 kV floating column Ar ion gun
- Low voltage depth profiling for ultra thin films
- Bend in column to stop neutrals
- Compucentric Zalar rotation
- Micro Area depth profiling
- Multi-point depth profiling

Organic Thin Film Analysis

- Optional C_{60} cluster source ion gun
- Optional Ar_{2500} cluster source ion gun
- Mass filtered ion beam
- Bend in column to stop neutrals
- Sputters many polymer and organic materials without damaging their chemistry

Optimized Configuration

A focused x-ray beam, high sensitivity spectrometer, high performance floating column ion gun, turnkey dual beam charge neutralization, compucentric Zalar rotation, and advanced data reduction algorithms provide the highest performance XPS depth profiling capability available. Applications include: semiconductor thin film structures, magnetic media thin films, optical coatings, decorative coatings, wear coatings and, with the optional C60 or GCIB cluster ion beams, polymer and organic thin films such as time release drug coatings and organic LED films.

PHYSICAL ELECTRONICS
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Standard Features

- XPS microprobe with ≤ 7.5 μm spatial resolution
- High sensitivity electrostatic detection optics
- Dual beam charge neutralization
- Robotic sample handling
- Samples up to 100 mm diameter and 25 mm thick
- Two internal sample parking stations
- High performance floating column ion gun
- High speed snapshot depth profiling mode
- Quantitative chemical state mapping
- Automated Angle Dependent profiles
- PHI MultiPak data reduction software

Optional Accessories

- Sample Positioning Station
- Dedicated turbo pump for Ar ion gun
- Hot/Cold sample stage
- Cold sample introduction apparatus
- Sample transfer chamber to external test stations
- C_{60} sputter ion gun
- Ar_{2500} Gas Cluster Ion Beam (GCIB)