X-ray Photoelectron Spectroscopy (XPS)

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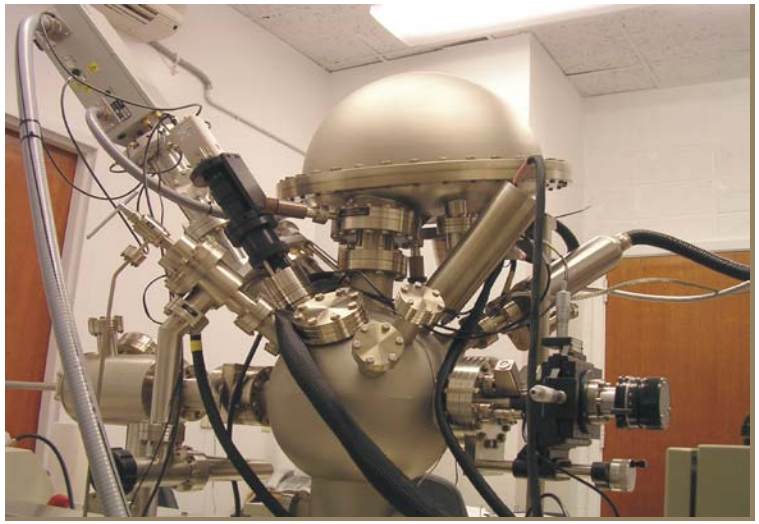
X-ray Photoelectron Spectroscopy

- XPS is the most widely used surface analysis technique because of its relative simplicity in use and data interpretation. The information XPS provides about surface layers or thin film structures is of value in many industrial applications.
- XPS measures the electronic states in a solid by irradiating a specimen with monochromatic x-ray radiation and analyzing the emitted photoelectrons.



VG Microtech MultiLab
ESCA 2000 System

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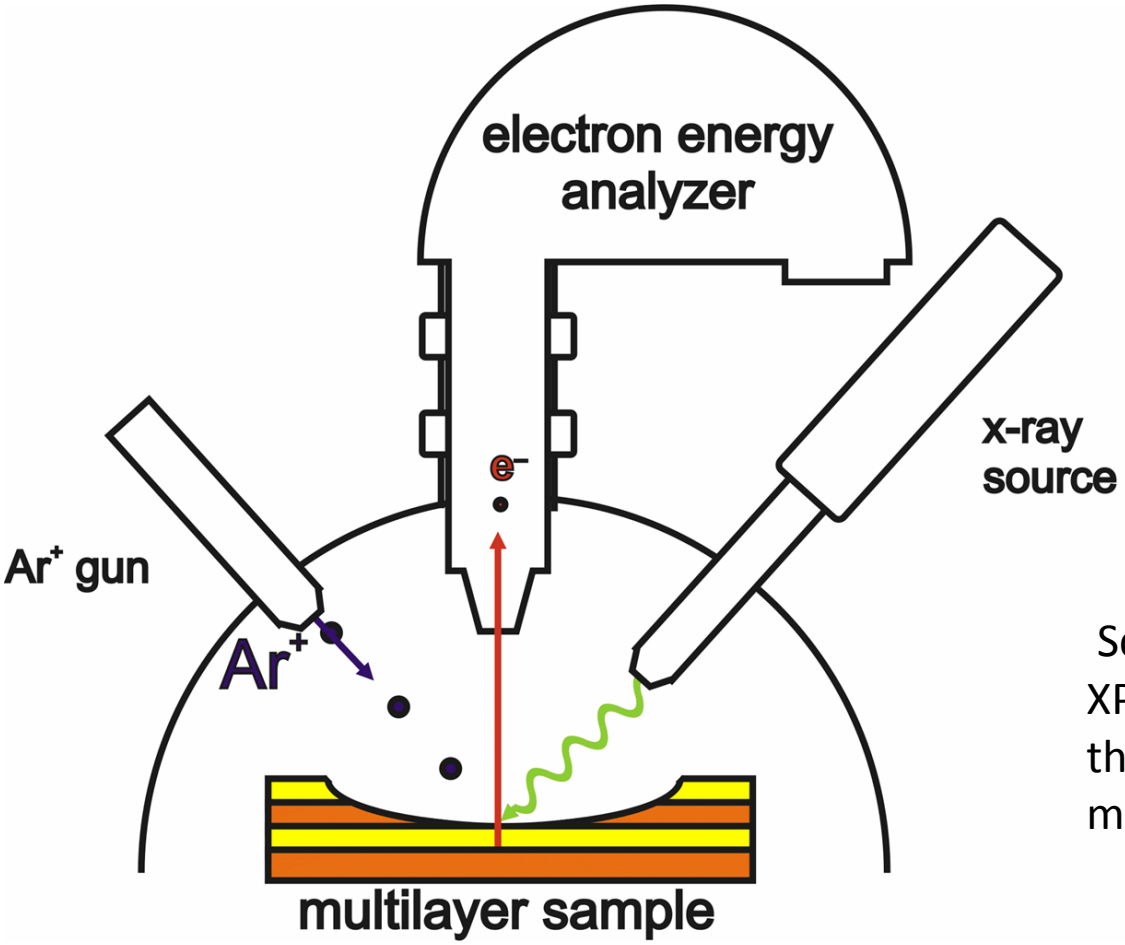
Key Features of the XPS

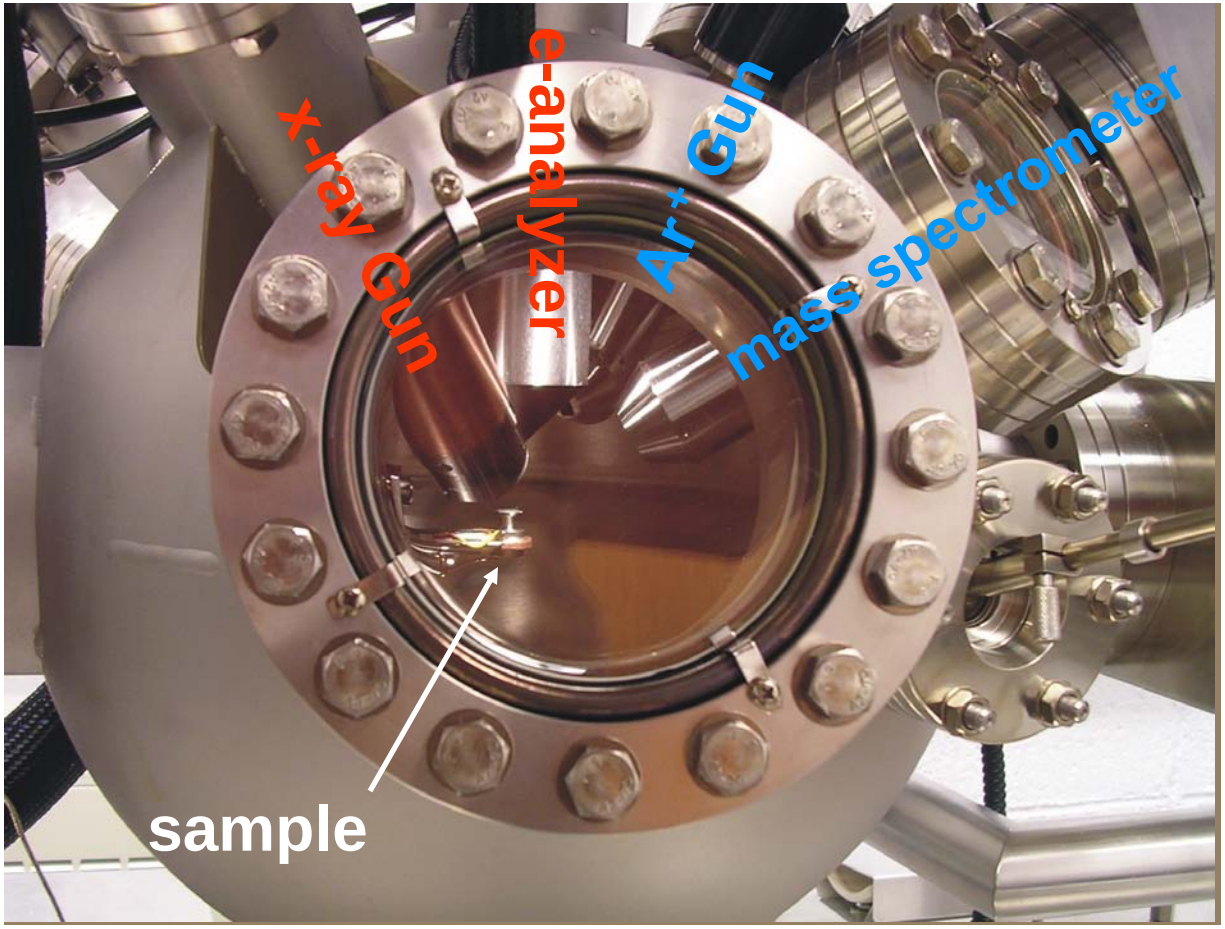
- Chemical Identification: of all elements except hydrogen and helium
- Surface sensitivity: measures outer 10 -60 Å of a sample
- Detection limit: 0.1 atomic percent
- Quantification of the surface concentrations of elements present
- Determination of molecular environment and/or oxidation state
- Destructive depth profiling using argon etching
- Non-destructive depth profiling using angular dependence
- Information on surface electrical properties from charging studies

Key Features of the XPS



Schematic diagram of the XPS apparatus, illustrating the depth profiling of a multilayer sample.

The Analysis Chamber



Specifications

- Analyzer special resolution: 100 μm
- Energy resolution: 10 meV.
- X-ray sources (line widths): Mg Ka (0.7 eV) and Al Ka (0.85 eV)

Our Clients

Clients of the XPS have included both industrial and academic users:

Ocean Nutrition

Selected Publications

Bayindir, Z.; Duchesne, P. N.; Cook, S. C.; et al. , X-ray spectroscopy studies on the surface structural characteristics and electronic properties of platinum nanoparticles, J. Chem. Phys., 131, 244716 (2009).

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Burke, Paul J.; Bayindir, Zeynel; Kipouros, Georges J. , X-ray Photoelectron Spectroscopy (XPS) Investigation of the Surface Film on Magnesium Powders, Applied Spectroscopy, 66, 510-518 (2012).

M. A. MacDonald, P. Zhang, H. Qian, R. Jin, Site -Specific and Size-Dependent Bonding of Compositionallly Precise Gold/Thiolate Nanoparticles from x-ray spectroscopy, J. Phys. Chem. LEtt. 1, 1821 (2010).

J. D. Padmos, P. Duchesne, M. J. Dunbar and P. Zhang, Gold Nanoparticles on Titanium and Interaction with Prototyep Protein, J. Biomed. Mater. Res. A., 95, 146 (2010).

Xingwen Yu, Peter G. Pickup, Pb and Sb modified Pt/C catalysts for direct formic acid fueld cells, Electrochim. Acta, 55, 7354-7361, (2010).

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