



SURFACE ANALYSIS CAPABILITIES

SUMMARY

Electron spectroscopic methods are used to determine the chemical composition and distribution of the first five to ten atomic layers of a solid material. In each of these techniques, characteristic electrons are generated in the surface layers of the material.

X-ray photoelectron spectroscopy photoionizes inner shell electrons, while Auger electron spectroscopy uses an electron beam to produce a secondary ionization (Auger effect). These electrons are emitted at a specific kinetic energy unique to the element of origination. Electron spectroscopic techniques can detect all elements with the exception of hydrogen and helium at or below 0.1 atomic percent. Surface elemental mapping, point analysis, and chemical-state identification are possible using electron spectroscopy. By using an argon ion gun to remove surface material, elemental composition as a function of depth can be obtained.

TEST APPARATUS AND PROCEDURE

The analysis is performed using a Physical Electronics 5600 XPS-Auger Multi-technique system. Samples are pumped to high vacuum in an introduction chamber and then moved to the analysis position in the spectrometer. The areas of interest on the sample are then located, and qualitative and quantitative analyses are performed. Analysis of the elemental chemical state can also be made.

TEST SAMPLES

The samples must be stable in vacuum without excessive outgassing and be less than 1.3 cm (0.5 in.) thick and less than 5 cm (2 in.) in diameter. Samples with uniform surfaces yield the best results.

APPLICATIONS

- Corrosion
- Wear
- Failure Analysis
- Adhesion
- Passivation
- Contamination
- Thin Films
- Bicompatibility
- Oxide States
- Polymer Surfaces
- Microelectronics

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