

Surface analysis by XPS

Elemental analysis and applications in microelectronics

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The X-ray Photoelectron Spectroscopy (XPS) is the surface technique with the broadest and most comprehensive range of applications. In surface science, it enables the direct study of electronic structure, chemical bonding, chemisorbed surfaces.... In materials science, its applications range from catalysis to microelectronics, adhesion, composites, epitaxy and thin film deposition, surface modification and treatment, corrosion, the study of polymer aging, biomaterials and implants, batteries. In the electronics industry, the technique is already used in production and online for quality control, detection of surface contamination, verification of film thickness and homogeneity, defect analysis, and troubleshooting.

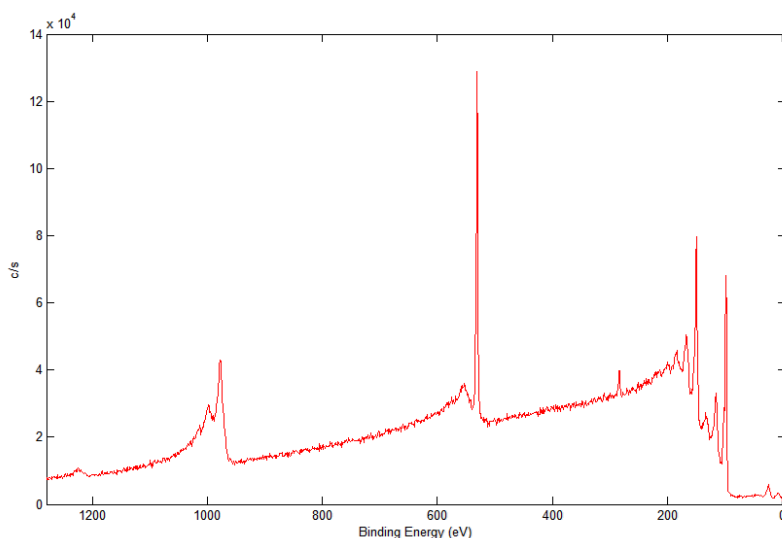


Figure 1: XPS survey spectrum of a silicon wafer

In this practical session, we will screen the basic theory of the spectroscopy and shows different examples of applications especially in the framework of the microelectronic and the energy storage. Silicon-based materials, metals and oxides will be analyzed by XPS in the aim to probe the surface chemistry and morphological aspect (thicknesses, composition...).