

XPS: X-Ray Photoelectron Spectroscopy

ESCA: Electron Spectroscopy for Chemical Analysis

What is X-ray Photoelectron Spectroscopy?

XPS, also known as ESCA, is the most widely used surface analysis technique because of its relative simplicity in use and data interpretation. The sample is irradiated with mono-energetic x-rays causing photoelectrons to be emitted from the sample surface. An electron energy analyzer determines the binding energy of the photoelectrons. From the binding energy and intensity of a photoelectron peak, the elemental identity, chemical state, and quantity of an element are determined. The information XPS provides about surface layers or thin film structures is of value in many industrial applications including: polymer surface modification, catalysis, corrosion, adhesion, semiconductor and dielectric materials, electronics packaging, magnetic media, and thin film coatings used in a number of industries.

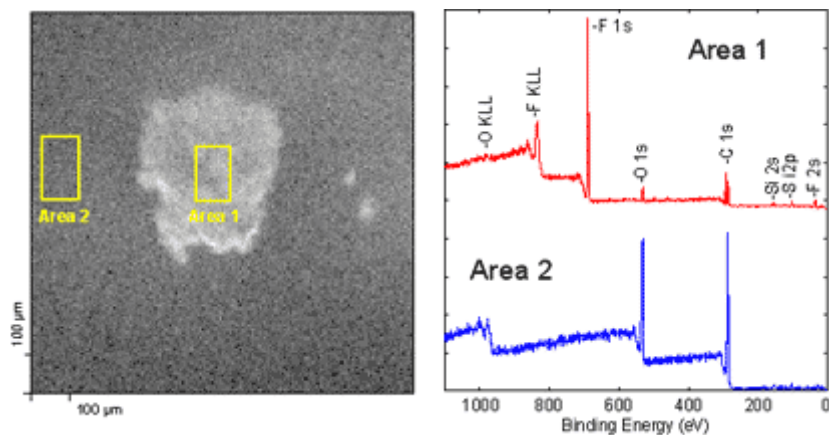


Fig. 1: X-ray beam induced secondary electron image and survey spectra from selected areas on a contaminated polymer surface that show the presence of fluorine in the contaminated area.

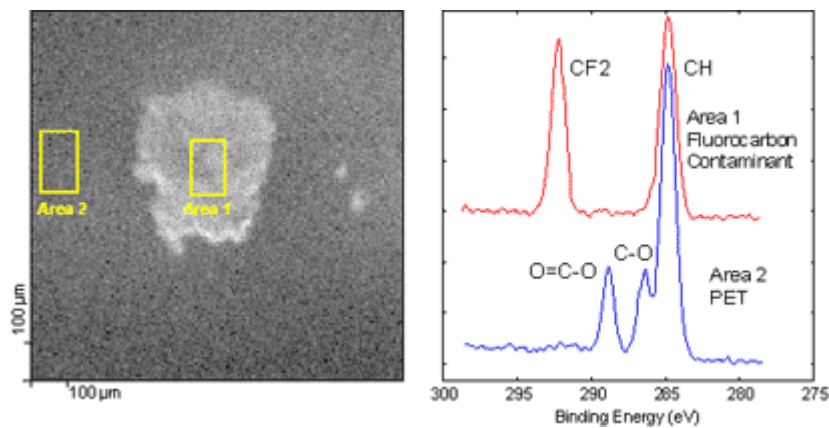


Fig. 2: High resolution carbon 1s spectra from the same selected areas that show the presence of a fluorocarbon contamination in localized areas on the polymer surface.

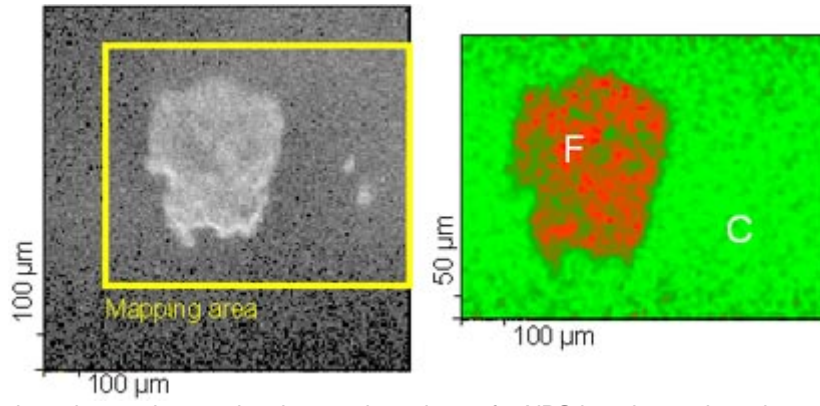


Fig. 3: Secondary electron image showing a selected area for XPS imaging and a color overlay image of carbon and fluorine 1s maps that confirm the presence of a localized fluorocarbon surface contaminant.