

# ULVAC-PHI on-line Seminar

**November 27, 2024 2:00 PM to 3:00 PM (JST)**

## Introduction of Al and Cr Applications Seminar



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### Seminar Summary

X-ray Photoelectron Spectroscopy (XPS), also known as Electron Spectroscopy for Chemical Analysis (ESCA), is a surface characterization technique that delivers the information of elemental composition and chemical bonding state at the outmost nanoscale surface by irradiating x-rays onto the sample surface and measuring the kinetic energy of the photoelectrons emitted from the sample surface. When the energy of the x-ray source exceeds 5 keV, the technique is referred to as Hard X-ray Photoelectron Spectroscopy (HAXPES). The PHI GENESIS is equipped with a dual scanning X-ray source composed of a conventional soft X-ray source (Al K $\alpha$ , 1484.6 eV) and a hard X-ray source (Cr K $\alpha$ , 5414.8 eV). In situ XPS and HAXPES analyses are available by simply switching x-ray source through software control. XPS provides the

chemical state composition of the outmost surface up to approximately 10 nm, while non-destructive HAXPES enables the investigation of deeper depths, reaching around 30 nm. The complementary characterization at nanoscale surface and bulk can be achieved. Moreover, HAXPES provides more information regarding core level photoelectron compared to the XPS, and Auger electrons at HAXPES spectrum are shifted to higher binding energy position due to higher energy of x-ray source, which can alleviate the complicated data reduction for the overlapped-photoelectron and Auger peaks at XPS spectrum. In this seminar, an overview of PHI GENESIS XPS and HAXPES, demonstrating the surface characterization capability of lab-based XPS and HAXPES instrument for the analysis of the novel materials.