



International

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ISO 5861

**Surface chemical analysis — X-ray
photoelectron spectroscopy —
Method of intensity calibration for
quartz-crystal monochromated Al
K α XPS instruments**

**First edition
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X-ray photoelectron spectroscopy is routinely used to measure the elemental composition of surfaces and the depth distribution of those elements. The translation of peak intensities into elemental compositions and depth distributions in the absence of reference materials relies upon comparison of the relative peak intensities to external reference data. The kinetic energies of the peaks being compared are different and therefore it is important to know the relative transmission and detection efficiency of electrons at different kinetic energies to achieve a meaningful comparison to the external reference data. International interlaboratory studies demonstrate that XPS instruments display markedly different transmission characteristics. Consistent intensity scale calibration enables the direct comparison of XPS results and enables international trade through trust in measurements throughout the supply chain and in the comparability of data from analytical service providers.

This document provides a method to determine the relative response of X-ray photoelectron spectrometers which utilise quartz-crystal-monochromated Al $K\alpha$ radiation as the excitation source. Clean low-density poly(ethylene) is employed as a reference material. Measured intensities from clean low-density poly(ethylene) are compared to reference intensities at specific electron kinetic energies to determine the relative response of electrons to the detector. The resulting relative response function is traceable to accurate reference spectra for copper, silver and gold held by the National Physical Laboratory, UK.