

Applications of Compton Peak Correction Method in Quantitative XRF Analysis

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Compton peak correction has been a routine method for quantitative elemental analysis by x-ray fluorescence, especially for the unknown light matrix materials like polymers and organic solutions. But there is a common misunderstanding that Compton correction method does not require the knowledge about the nature of the base material which means that the standard and sample do not need to be matrix match. In this paper two applications (Si-analysis in Silane liquid; P-analysis in unknown polymer beads) were demonstrated that the accurate analysis could only be obtained from a standard which matrix was close to the samples. Two water-based and one oil-based standards for elements Si, Al, P and S were measured for analyte and Compton peak intensities, a straight line calibration curve (intensity vs. ratio of analyte and Compton peak intensities) could not be drawn through three data points. Two water standards are on a straight line passing intercept zero and oil standard was left outside of the line. This indicates the Compton peak correction is only valid for close-matrix samples. A simplified calculation of mass absorption coefficients for analyte and Compton peak explained the reason of close-matrix requirement between standard and samples: the ratios of mass absorption coefficients for wavelength of analyte and tube Compton peak are different for different matrix standards.