DEVELOPMENT OF QUANTIFICATION METHOD USING FUNDAMENTAL PARAMETER METHOD FOR EDXRF

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Standardless analysis using fundamental parameter (FP) method is an essential quantification method in EDXRF because standard samples are not available in many cases and easy sample handling is a feature of EDXRF especially for screening analysis.

In conventional quantification routines, data reduction process is carried out in three steps. (1) elemental identification of peaks (2) peak deconvolution where line overlaps exist and obtaining net intensities (3) fundamental parameter method to obtain quantitative results. However, this procedure does not yield accurate results because of erroneous peak deconvolution and net intensities obtained since there are many line overlaps in EDXRF. For example, Kα and Kβ lines of elements with adjacent atomic numbers can overlap. However, intensity ratios of Kα to Kβ vary depending on the sample. Therefore, accurate peak deconvolution can not be done without utilizing the composition information of the sample.

We have developed a quantification method whereby the theoretical spectrum based on sample composition obtained by the FP method is fitted to the actual measured spectrum. As a result, accurate net intensities were obtained even where complicated line overlaps exist. Additionally, scattering intensities are introduced to correct for the composition of non-measuring elements such as H, C and O. Analysis results using this method show good agreement with chemical values for soil and biological applications.

The computational scheme of this method and some application results will be presented.