

STRATEGY OF FUSION BEAD CORRECTION IN XRF ANALYSIS OF POWDERS

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The fusion bead method is an effective sample preparation technique for accurate analysis of a wide variety of powder samples by XRF spectrometry such as ores, rocks and refractory materials since it eliminates heterogeneity due to grain size effects and mineralogical composition. Analytical errors in the fusion bead method may occur; however, due to loss on ignition (LOI) or gain on ignition (GOI) by the sample during fusion, volatilization of the flux during fusion, or weighing inaccuracies.

Historically, attempts to correct for changes in recorded weight based on final fusion bead weight and sample weight and to correct for LOI/GOI have been applied in the calibration method to eliminate these error factors in the fusion method for ore analysis, but the application of these correction methods is limited and inflexible. We have established a unique, easy-to-use, universal fusion bead correction method from the principle of x-ray absorption characteristics using influence coefficients determined by a fundamental parameter method. The method can be used in correcting for sample LOI/GOI, flux volatilization, and variations in dilution ratio due to weighing considerations. We have demonstrated that the method accurately corrects for these effects in various kinds of ores and minerals, including iron ore.

In this report we will overview the principle and theoretical background of the fusion bead correction method and present results from certain application examples using this method.