

Improving Handheld XRF Performance in Geological Samples

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Abstract

Widely varying chemical composition and strong matrix effects make the development of a universal portable XRF calibration for geological materials a very challenging task. Over the years, continuous development of calibrations for geological materials has helped extend the application range and performance of portable XRF. Bruker's Geochem calibration package for the S1 TITAN performs well, giving quantitative to semi-quantitative analysis for a variety of matrices using a single set of empirical calibrations. In order to improve the performance of these factory Geochem calibrations for the Bruker S1 TITAN and TRACER 5i, the calibrations were split into two sub-calibration sets. One optimizes for sulfide matrix and one optimizes for oxide matrix. An automatic sort has been created to send unknown samples to the correct calibration for its matrix composition. Other improvements were also made to the calibrations and sample preparation. The resulting applications, now called Exploration and Mining, show improved results over the old Geochem General and Geochem Trace calibrations. Between the Exploration and Mining applications, ppm levels up to high weight percent found in concentrates can be more accurately analyzed in well-prepared geological samples. This presentation will highlight some of the changes made and show examples of improved performance with the new application package.