Utilizing Standards to Improve Energy Dispersive Spectroscopy Quantification in TEAM™

Energy Dispersive Spectroscopy (EDS) quantification in TEAM™ utilizes a unique eZAF (atomic number (Z), absorption (A) and fluorescence (F)) algorithm to calculate the quantity of an element detected by the software application. Once a spectrum is captured, these measurements are available automatically by means of the “Quant” button in the Spectrum Toolbox, and can be displayed as weight percent, atomic percent, or oxide ratio. This measurement is known as a “standardless” quantification, as it does not employ any measured standards in the correction. The eZAF correction works well for both polished and rough samples alike, as well as samples tilted to 70° for EBSD work.

For those analyses requiring a higher degree of quantitative accuracy, standards can be incorporated into the quantification routine. Collection of standards for improved quantitation requires a set of known reference materials (purchased certified standards, samples independently quantified by another analysis technique, etc.), as well as a means of accurately measuring beam current, such as a picoammeter. If one is unable to measure beam current accurately and consistently, standards must be reevaluated every session to ensure consistent current between the standard and the unknown.

After a spectrum for a known material is acquired, the standards can be incorporated into your quantification by selecting “Calculate Standard” under the Quantification section of the Spectrum Tools panel. Use this menu to input the concentrations of the known material and click “Calculate Standard CPS” when complete (Figure 1). One can then begin acquisition of unknowns while applying the newly measured standard by selecting “Calculate Standard” again, inputting the beam current, and selecting the desired standard from the saved options (Figure 2).

It is important to keep in mind that a critical part of the quantification process, be it standards-based or standardless, is to ensure a good background fit. TEAM™ offers both manual and automatic background corrections in the “Background” section of the Spectrum Toolbox (Figure 3).