



Multi-Point Backgrounds

High Accuracy Trace Element Determinations

High accuracy trace element determinations generally require high precision spectrometer scans to optimize placement of the high and low side background positions in order to avoid possible interferences on the off-peak intensity measurement. In high sensitivity measurements, the presence of minor and even trace levels of unexpected elements may cause significant interferences with the nominal high and low off-peak positions of the analytical peak in question. Therefore, in materials where the composition is variable or several different phases are present, it is usually necessary to perform many time-consuming spectrometer scans at sufficiently high precision levels to avoid these interferences and other continuum artifacts such as “holes” in the background as described by Self, Wark and other workers.

New Multi-Point Background Feature

To handle these situations automatically and accurately, Probe Software in conjunction with researchers at the University of Massachusetts have developed new acquisition and calculation methods collectively known as the “multi-point background” feature. This multi-point background acquisition will automatically acquire a number of off-peak intensities distributed on each side of the analytical peak (which can be specified precisely by the user) so that at least a few of the background measurements will be unaffected by the unexpected presence of other elements or continuum artifacts that could lead to systematic errors. The background intensity is calculated automatically by iteratively looping on the measured multi-point intensities and optimizing on the best fit of the relative lowest variances until the specified number of valid background positions is reached.

Here is a screen shot showing this multi-point background calculation for one data point. As can be seen, the off-peak positions closer to the Pb Ma analytical line were interfered by the tails of the Th Mz1 and Mz2 lines (there is no Pb in this ThSiO₄ sample). However, the program correctly iterates the multi-point off-peak backgrounds to find the best fit to remove the problematic background measurements automatically:

