

Create Max Pixel Spectrum Function

One of the features that quite a few people don't seem to take advantage of in the TEAM™ software is the little icon shown  to the right. You might not even recognize it since it only shows up when you have a map open and the sum spectrum displayed but the function associated with it is called "Create Max Pixel Spectrum".

The idea of a max pixel spectrum is that while TEAM™ can automatically identify the dominant elements in the map based on a preview spectrum, it gets a little more tricky when you are looking at small inclusions and particles. If you have a small Ti inclusion that only covers 5-10 pixels in a 512x200 map that otherwise does not contain Ti, the contribution of Ti to the sum spectrum will be less than a percent of a percent. Essentially, Ti will not show up in the sum spectrum although the inclusion might be 100% Ti. The max pixel spectrum will search through all pixels in the map for each energy channel and find the pixel that has the most counts for that energy. An artificial spectrum is then generated with each energy channel corresponding to the highest count number for that given energy. The spectrum will typically be quite noisy since it is based on individual pixel counts (unless binning is applied), but it has the advantage that any inclusions will show up much more clearly and can now easily be identified. Basically, you are finding the needle in the haystack.

In the spectrum in Figure 1, you can see that there are several peaks showing up in the max pixel spectrum that are not obvious in the sum spectrum. Also note, the point highlighted as "MaxSpc" in the image

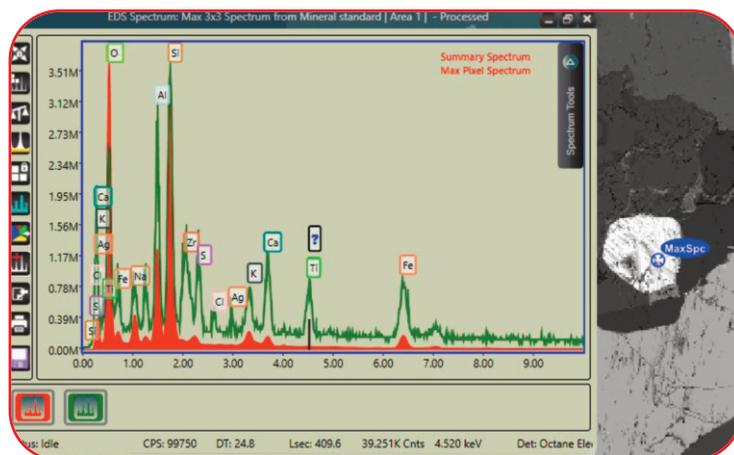


Figure 1. Shows several peaks from the max pixel spectrum, which are not obvious in the sum spectrum. The point highlighted as "MaxSpc" in the image to the right of the spectrum is the pixel that has the highest number of counts at the position of the marker in the spectrum window, in this case Ti.

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Knowing that the elements shown by the max pixel spectrum are 'hidden' in the collected data, you can now rebuild to include them in the elemental maps. The images below (Figure 2) show the backscatter image of the sample and the overlaid Zr and Ti maps. Extracting the spectra from the Zr and Ti rich inclusions shows that while neither element has a significant contribution to the sum spectrum, the inclusions are rich in the detected elements.

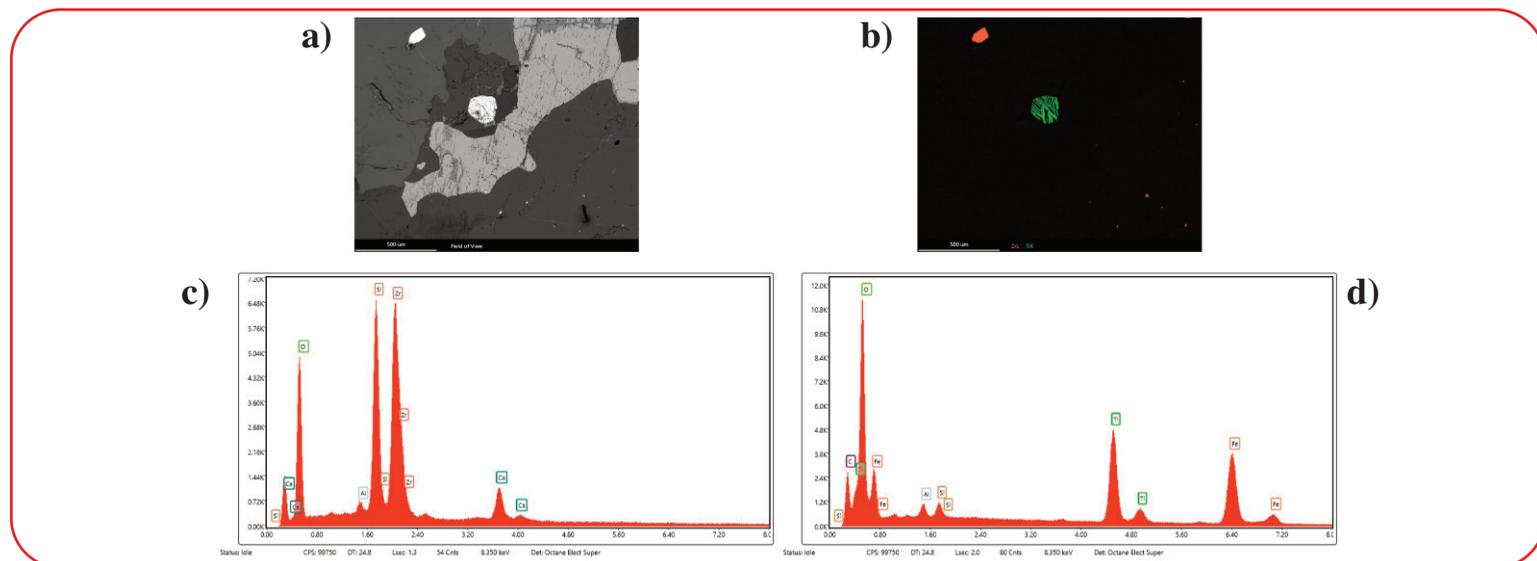


Figure 2. The sample a) backscatter image and b) overlaid Zr and Ti maps. Spectra extracted from the c) Zr and d) Ti rich inclusions.