COMBINATION OF EPMA AND MICRO-XRF IN AN SEM

– STEPS TO A COMPLETE ELEMENTAL ANALYSIS?

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X-Ray spectroscopy is a well-established analytical method for elemental analysis. The excitation mode strongly influences their sensitivity in dependence of the element of interest. For example will it be possible to excite light elements with electrons but heavy elements much better by photons. A combination of both excitation modes is possible in an electron microscope. Electron-probe-micro-analysis is known as an effective and powerful tool for position sensitive elemental analysis which can be used especially for light elements down to Carbon or even Boron. On the other hand X-Ray fluorescence can be used for sensitive analysis of heavy elements due to the low spectral background and high excitation efficiency for these elements. With an x-ray optic it is even possible to concentrate tube radiation and realise a position sensitive X-Ray fluorescence. This method is already introduced as micro-XRF with different table top devices. This type of excitation is available now also for a SEM.

In that case the special benefits of both excitation modes can be combined for quantification, i.e. the information about light elements from EPMA can be used for a better description of matrix interaction for XRF and the information about heavy elements from XRF can be used for a more precise calculation of the spectral background of EPMA. This improves the accuracy of quantification for both methods.

The paper presents a µ-XRF excitation unit for SEM's and describes the quantification model that is prepared or this device. Results for different sample qualities show that the standardless quantification give a good accuracy. In case of light elements like C, O or N the XRF results can be improved by consideration of results from EPMA.