



Errors in the determination of the limits of detection using JEOL's electron microprobe interface.

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The first commercially available electron microprobe was made in the middle of XIX century. At the moment, this technique of determination of chemical composition of matter has a lot of applications in Geoscience, even in trace element analysis.

During our work in the field of spectroscopy of minerals, it was necessary to determine the EPMA limits of detection for trace elements in sulphides.

We measured several samples of synthetic sulfides (sphalerite, covellite) with the concentration of gold in the range from 15 to 5000 ppm using JEOL-JXA8200 in IGEM RAS and JEOL-JXA8230 in MSU equipped with energy-dispersive and 5 wavelength spectrometers, employing different crystals (PETH or LIFH), modes (integral or differential), acceleration voltage, counting time, and the beam size.

We calculated the real limit of detection, using the equation from the EPMA JXA-8200 Manual and [Reed, 2000]. Our data did not correspond with the values appears on the screen after the analysis.

The difference in estimation of the limits of detection between our and computer's data varies from 8 up to 13 times.

We suggested that observed dissimilarity of the typed and the real values may be related to desire JEOL Ltd to promote devices for better selling.

We are firmly recommend checking this values while performing the trace element analysis.

References

JEOL JXA8200 Manual

Reed S.J.B. (2000) Quantitative trace analysis by wavelength-dispersive EPMA. *Mikrochim. Acta* 132 145-151.