

DETERMINATION OF TRACE ELEMENTS IN VARIOUS MATRICES

J. Makjanić, I. Orlič, D. Rendić, V. Valković
Ruder Bošković Institute, Zagreb

X-ray fluorescence spectroscopy is a suitable method for determination of trace elements in various types of samples (i.e. determination of uranium in coal or geological samples). If the sample is not infinitely thin, the difference in matrices has to be taken into account. For this purpose a computer program has been developed which calculates final concentrations by iteration, on the basis of only one standard sample. As the input data the program takes relative sensitivities for all characteristic lines in an infinitely thin target, approximate composition of the main elements in the sample that cannot be detected by XRF, the calibration curve for one characteristic element present in all samples, and measured intensities of the characteristic lines of all elements in the sample. If the matrix of the sample being analysed is different from that one in the standard sample, the final results differ from initial results considerably.

Some of the results obtained in cases of two geological samples are listed below. X-ray tube with Mo anode has been used for sample excitation, working conditions for Philips roentgen apparatus being 26 kV, 6 mA. The X-ray beam passed through Zr, Ti and Mo filter to reduce its intensity. Si(Li) detector was used for detection of characteristic X-rays.

Element		K (%)	Ca (%)	Ti (%)	Fe (ppm)	Ni (ppm)	Zn (ppm)	Sr (ppm)
SAMPLE	initial concentrations	4.252	0.641	0.773	5.520	244	69	30
	after 8 iterations	4.252	0.644	0.777	5.554	246	69	30
SAMPLE	initial concentrations	3.030	24.372	0.190	0.956	31	40	61
	after 27 iterations	4.450	38.482	0.399	2.031	68	88	136