X-ray fluorescence spectrometry has been recognized as an indispensable and powerful elemental analysis technique for many years. [1-4]. XRF measurement techniques have focused primarily on detecting individual X rays. With the objectives of improving measurement sensitivity by minimizing source photon back-scattered background and matrix effects, the authors are applying coincidence spectroscopy to the XRF measurement.

According to previous work [5-9], the main interfering background for the lead in bone measurement is from back-scattered source photons, which are also the main problem for the improvement of sensitivity. Based on the physics of atomic transition, certain fractions of the characteristic K-series X rays and L-series X rays are in true coincidence [10, 11]. With an advanced CAMAC data acquisition system, a coincidence spectroscopy system is proposed in this work, which has been optimized by preliminary Monte Carlo simulation. Experimental results are presented and the quantification techniques customized for coincidence spectra are discussed.

References


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