Evaluation of Semi-Parametric NAA Results Using Standard Reference Materials

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Neutron Activation Analysis (NAA) is a powerful analytical tool that has been thoroughly used in analyses of several different materials. Among the different ways to peforme this type of analysis, LEER has been using the semi-parametric variation, that has the advantage that it doesn't require the simultaneous use of standard reference materials with each sample analysed, for each element to be determined, in biological matrices.

In this method, the samples to be analysed are irradiated with neutrons together with two Au foils, one bare and the other covered with Cd to block the thermal neutrons; from these data, the thermal neutron flux is calculated and this, in turn, is used to perform the activation calculation for the elements in the samples to be analysed.

This analysis, though, requires good knowledge of many parameters, as physical constants associated with the nuclear activation and decay process and the experimental setup; although these are usually very well determined, there are some approximations that have to be talken into account for practical reasons; also, the propagation of the uncertainties from all these parameters may result in quite large experimental uncertainties in the end of the process.

In order to verify the accuracy, the precision and the overall reliability of the semi-parametric method, samples of several different Standard Reference Materials (SRM's) were analysed using this method, and the resuls were statistically analysed and compared to the nominal values, proving that the technique is suitable for the analyses performed by LEER.