Introduction

Due to its selectivity and sensitivity, neutron activation analysis (NAA) occupies an important place among the various analytical methods. It has proven to be a powerful non-destructive analytical technique for concentrations at or below the μg/g range, while up to 60 elements can be determined performing two irradiations and several gamma-spectrum measurements after different decay periods. The main fields of NAA application are analytical chemistry, geology, biology and the life and environmental science. Its accuracy, the virtual absence of matrix effects and the completely different physical basis when compared to other analytical techniques, make it particularly suitable for the certification of candidate reference materials (RMs), providing e.g. the bulk of the literature data on the standard RMs of the National Institute of Standards and Technology and reference materials of the International Atomic Energy Agency.

The k_0 standardisation method of NAA (k_0-NAA), a concept launched in 1975, can be interpreted as an absolute standardisation method. It relies on k_0 and Q_0 factors and a few other parameters, which are composite constants that can be derived from the basic nuclear data. In practice they are usually determined by direct measurements, partly because equivalent constants derived from the basic data are often discrepant.

The aim of the Co-ordinated Research Project (CRP) on the Reference Database for Neutron Activation Analysis is to improve the status of the database of nuclear constants for k_0-NAA, to contribute to the nuclear structure and decay data and to remove or reduce some of the discrepancies that exist between the integral constants and values derived from differential data.

The INDC Committee, which reviews the programme of the IAEA-NDS has endorsed the CRP at the meeting held in May 2002. A complementary project is in progress at NAPC-Industrial Applications and Chemistry section on "k_0-IAEA Software Development for Neutron Activation Analysis". This software package is chosen as the reference analysis tool for the CRP.

The 1st Research Coordination Meeting (RCM) was held at the IAEA, Vienna, Austria, 3-5 October 2005, and is summarized in IAEA report INDC(NDS)-0477, the 2nd RCM was held at the IAEA, Vienna, Austria, 7-9 May 2007 and is summarized in IAEA report INDC(NDS)-0514 and the 3rd RCM was held at the IAEA, Vienna, Austria, 17-19 November 2008 and is summarized in IAEA report INDC(NDS)-0xxx.