

**HIGH ACCURACY INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS
OF CHLORINE IN LUBRICATING BASE OILS (SRM 1818a)
USING PRIMARY STANDARDS**

L. TANDON and D. A. BECKER

Nuclear Methods Group
National Institute of Standards & Technology
Gaithersburg MD 20899

Laboratories all over the world depend upon the integrity of the Standard Reference Materials (SRMs) to provide quality assurance information and documentation for their analytical programs. Neutron activation analysis (NAA), including instrumental and radiochemical NAA, is one of the primary analytical techniques used for the certification of elemental concentrations in biological, geological, and environmental SRMs at the National Institute of Standards and Technology (NIST). NAA has high sensitivity and selectivity for many elements in different matrices. Better understanding and minimization of all the possible sources of error in NAA would allow improvements in overall quality of these SRMs. However, it is impossible to be sure that all possible sources of error have been found, so multiple control materials were used to confirm accuracy and precision. A secondary primary standard can be an effective control as well as a second standard.

Since NAA has high sensitivity and specificity for chlorine in many different matrices, this technique was selected for use in the certification of chlorine in SRM 1818a, a set of Lubricating Base Oils. This SRM should be useful as standards for the determination of chlorine in unused and used lubricating base oils, as well as to analysts concerned with the crucial environmental problems of PCB's in waste materials, particularly used oils. The results from this analysis of five different concentration levels of chlorine contained in the SRM; identification and minimization of all the known sources of errors or interference; calibration of the system using multiple primary standards will be presented. The control samples, which provide unique quality assurance in characterization of SRMs, are used to internally evaluate and cross-check the radioanalytical method. Our results on the control samples showed excellent agreements.