

Overlooked and unprecedented opportunities of neutron activation analysis for bulk analysis and metrology programs.

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Neutron activation analysis (NAA) seems to have lost its shine amongst the array of analytical techniques for measurement of chemical elements. There have been only marginal improvements in the NAA's capabilities compared to the achievements in other techniques. NAA is often depicted as a unique technique for the analysis of solid material without sample treatment, but its critics point to the often long turnaround time, complexity of access to the research-reactor based facilities and relatively high detection limits. But the criticised weaknesses have resulted in decreasing interest by researchers and third parties, and NAA seem to become a method of last choice when all other, and 'on-site' available techniques have failed. Continuous innovations in other techniques may further reduce also this remaining interest. These trends affect the sustainability of the NAA laboratory.

Nonetheless, national metrology institutes have welcomed NAA for its potential in their programs on metrology in chemistry. However, it is not always easy to justify an NAA facility for such purposes only. The other strength, and by researchers in the applied fields overlooked opportunity, lies with the analysis of large bulk samples, at much larger test portions than common in any other technique. Larger test portions contribute to minimize the contribution by the sampling error, which has often the major impact to the accuracy of measurement but which is commonly ignored for convenience.

There are currently no prospects for any other analytical technique to embark on bulk analysis at the level of NAA. NAA may therefore remain its value for complementary studies. But will bulk analysis and contributions to metrology programs it be sufficient to survive the next decade and can the downwards spiral of interest be discontinued or even reversed? A way forward requires a departure from the comfort zone in which many NAA practitioners seem to be resting. A concerted, unprejudiced and open-minded action is needed to overcome the remaining criticism on NAA's weaknesses, for further expanding its strengths and exploring untapped opportunities. The fact that the technique is thoroughly understood may be the basis for innovations and a different style of conduct, as will be discussed.

