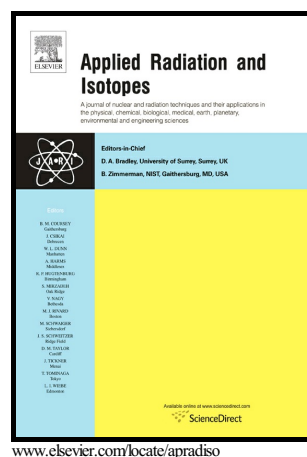


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Use of Genie 2000 and Excel VBA to correct for γ -ray interference in the determination of NORM building material activity concentrations

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Abstract

The γ -radiation emitted by building materials is calculated from the activity indices for ^{232}Th , ^{226}Ra and ^{40}K and expressed as the activity concentration index (ACI). Gamma spectroscopy is a non-destructive technique frequently used to simultaneously determine the indices for several radionuclides. Spectral interpretation poses a number of challenges, including identification of γ -lines subject to summing-in effects, interference from other γ -ray emitting radionuclides and the time required to reach secular equilibrium. These challenges are not fully addressed by Canberra Industries' Genie 2000, the software used by many laboratories to analyse samples. This article describes a Microsoft Excel workbook that exploits Genie 2000 flexibility to program applications with Visual Basic using Canberra's nuclear data access library and batch procedure tools. The workbook determines ^{40}K activity concentration after correcting for ^{228}Ac interference and ^{226}Ra activity directly from the γ -peak at 186.5 keV. The method proposed was tested by participating in 13 national and international scale inter-comparison exercises. The results were statistically indistinguishable from the reference values at a coverage factor of $k=3$ and no statistically significant differences were identified between the respective means by a Student's t pairwise comparison.

Keywords

Gamma-ray spectrometry; NORM; Spectral interferences; ^{40}K , ^{232}Th and ^{226}Ra activity concentration; Canberra Data Access Library; Genie 2000

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