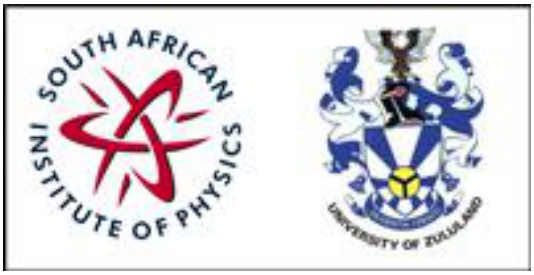

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Validation of the calculated efficiency parameters for the gamma-ray detector using 152Eu standard sources

Wednesday, 10 July 2013 17:40 (1 hour)

Abstract content
   (Max 300 words)

For radioactivity measurement of environmental samples, gamma-ray spectrometry with high resolution semiconductor detectors (e.g. HPGe) has been widely used. For these detectors, absolute peak efficiency for each gamma-ray energy with given measuring conditions (e.g. geometry, density, chemical composition) has to be determined or known. Efficiency calibrations of the detectors are mainly performed using standard radioactive sources with multiple gamma-ray lines covering the energy range of interest. Although the experimental determination of the detector efficiency is the most accurate method, volume sources containing 152Eu are mainly affected by coincidence or cascade summing. One effective method to overcome these deficiencies, Monte Carlo calculations has been incorporated for full-energy efficiencies calibrations of the detectors. Monte Carlo simulations provide flexibility in terms of geometrical dimensions, density and gamma-ray energy, thereby also minimising the use of radioactive materials.
In this study, we validate the simulated detector efficiency parameters by analysing three liquid standard radioactive sources. We present a comparison of the results for every gamma-ray energies in 152Eu as a function of the expected activity concentration in the three sample sources.

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