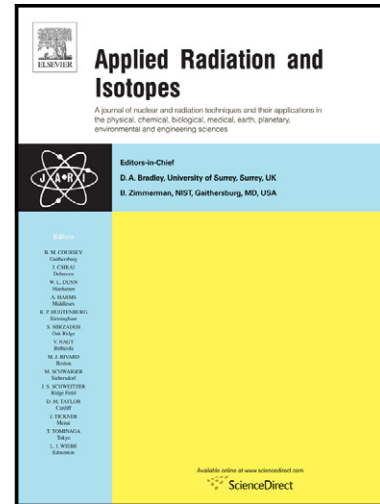


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Meryem Seferinođlu, Abdullah Dirican, Pınar Esra Erden, Demet Erçin



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Evaluation of uncertainty components associated with alpha-particle spectrometric measurements of uranium isotopes in water

Meryem Seferinođlu*, Abdullah Dirican, Pınar Esra Erden, Demet Erçin

Turkish Atomic Energy Authority, Saraykōy Nuclear Research and Training Center,
06983, Kazan, Ankara, Turkey

Abstract

Qualifications of uncertainties associated with the measurement of specific activity concentration of uranium radioisotope (^{238}U) in water samples by alpha-particle spectrometry are presented. Possible sources of uncertainty are identified and quantified in the activity concentration measurements of ^{238}U isotope; the major source being the statistical counting uncertainty as expected. The combined relative standard uncertainty $U(a_{238_U})$ of the measurement was calculated as 1.4 Bq kg^{-1} (7.9%) for the investigated NPL sample. The accuracy and precision of recommended procedure were checked analysing six spiked water samples supplied from IAEA-proficiency test exercises. The results were evaluated in terms of relative bias, z-score, u-score, trueness and precision. These results show that the activity values and their uncertainties are in good agreement with recommended values.

Keywords: measurement uncertainty, alpha-particle spectrometry, radiochemical separation, uranium in water

*Corresponding Author

meryem.seferinoglu@taek.gov.tr

Tel: +90-312-8101551

1. Introduction

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