

البحث الخامس (5)

Title: “Suggested Modification of the Fundamental Parameter Method: A Case Study to Calculate the Optimum Absolute Intensity of 1001.03 keV Gamma-Ray Transition”

Journal

Arab Journal of Nuclear Sciences and Applications, 52(4), 128-134.

الملخص باللغة الإنجليزية

The fundamental parameter method (FPM) is an analytical approach for intrinsic calibration of gamma-ray spectrometer using fundamental nuclear and atomic parameters such as gamma-ray branching intensity, half-life time, isotopic ratio and concentration ratio. The main advantage of this approach is the wide range of its applications in gamma-ray efficiency calibration, nuclear safeguards (nuclear materials measurement and isotopic ratios) and others. In this work, the calculation of the relative efficiency (RE: photopeak count rate divided by branching ratio) was modified based on the relative intensity concept of ^{226}Ra in equilibrium with ^{222}Rn decay products (^{214}Bi - ^{214}Pb). The modified FPM was applied to reevaluate the absolute intensity (I%) of gamma-ray transition of $^{234\text{m}}\text{Pa}$ at 1001.03 keV using certified uranium ore samples, ^{226}Ra point source and gamma-ray spectrometers based on hyper pure germanium detector. The newly confirmed I % of 1001.03 keV is 1.0164 ± 0.0636 .