

Determination of Unknown Radionuclides Using High Purity Germanium Detectors

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Abstract : The decay chain of radioactive elements in the laboratory and the verification of natural radioactivity of the human body was investigated using the High Purity Germanium (HPGe) detector. Properties of the HPGe detectors were also investigated. The efficiency and energy resolution of HPGe detector used in the laboratory was found to be excellent. The detector was calibrated three times so as to cover a wider energy range. Also the Centroid C of the detector was found to have a linear relationship with the energies of the known gamma-rays. Using the three calibrations of the detector, the energy of an unknown radionuclide was found to follow the decay chain of thorium-232 (^{232}Th) and it was also found that an average adult has about 2.5g Potassium-40 (^{40}K) in the body.

Keywords : detector, efficiency, energy, radionuclides, resolution

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