Universal (Alpha, Beta, Gamma, n) Geiger Detector

Mamchur, Maksim (School: Samara Regional Centre for Intellectually Gifted Children)

The goal of project is creating portative multifunction device for simultaneously registration α, β, γ radiation and low intensities neutrons. Novelty of the device is in combining the window from beryllium bronze and insert from a mix of paraffin and aluminum nanoparticles. Proposed detector construction provides the possibility of react α-corpuscles with beryllium to form neutrons which either lead to the knockout of protons or interacting with aluminum to the appearance of α-corpuscles. These corpuscles formed in chamber volume lead to breakdown of the gaseous medium of detector and the registration of the signal. Processing of signal registration is carried out by a microcontroller. Data is stored in memory and output on the screen of the device. Testing of the modified Geiger counter confirmed the ability of the device to register not only β, γ radiation, but also α corpuscles and neutrons. The achieved characteristics of the device allow simultaneously detection of radioactive contamination caused by different types of radiation and to determine the characteristics of the predominant radiation of radioactive samples in the research laboratory.