

SPECTROMETRIC AND RADIOMETRIC TECHNIQUES OF NUCLEAR RADIATIONS IN THE ASSESSMENT OF ENVIRONMENTAL RADIOACTIVITY

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Abstract. *The paper contains a synthesis of research results in the study of the level of environmental radioactivity obtained by using spectrometric technique, of high precision and high sensitivity, of atomic and nuclear radiations. Spectrometric technique were used to measure gamma nuclear radiation in determining the radioactivity of ash samples taken from the dumps of the ROMAG TERMO Drobeta Turnu Severin thermal power plant, Mehedinți county. By gamma spectrometry with high energy resolution semiconductor detector, high efficiency and protection for the cosmic radiation background (low radiation background) was determined the radioactivity of ash samples, taken from two coal dumps from ROMAG TERMO Drobeta Turnu Severin power plants, Romania. The results showed that the activities of the main radionuclides in the environmental samples including, ^{228}Ac ($7.5 \div 18.7$ Bq/kg), ^{226}Ra ($6.2 \div 21.3$ Bq/kg), ^{137}Cs ($0.3 \div 1.53$ Bq/kg) and ^{40}K ($169 \div 362$ Bq/kg) are among the lowest values found compared to the maximum allowed limits.*

Keywords: *environmental radioactivity, spectrometric techniques, radionuclides.*

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1. Introduction

In nuclear physics, radioactivity is defined by the totality of processes and phenomena of spontaneous emission of alpha, beta (corpuscular radiation) and gamma (electromagnetic) radiation by an unstable atomic nucleus, without external intervention [1, 2, 3].

Unstable nuclei also called natural or induced radionuclides (artificial radionuclides) can be dispersed in the environment in various forms, gases, liquids (radioactively contaminated precipitation) and solid materials (soils, ash resulting from burning coal in thermal power plants, etc.). atmosphere are driven by the processes of diffusion and transport due to air currents and temperature gradient. Atmospheric deposition of radionuclides on soil, surface water and vegetation is influenced by the dynamics of air masses, gravity and precipitation[2, 3]. In surface and deep waters, through the diffusion and transport processes that take place, the spread over long distances of radionuclides is absorbed by the plants and the animal organisms encountered. Atmospheric deposition of radionuclides leads to an increase in the level of radioactivity of the soil at different depths depending on precipitation and the

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