In vivo detection of cadmium is one of the most important research area at the Medical Physics. The PGNAA method is based on the measurement of prompt γ-ray emitted during the neutron irradiation of a sample. In our PGNAA designed system for biological sample analysis, 20Ci Am-Be neutron Source is used. In This work, experimentally, we compared the detection ability of HPGe, BGO and NaI(Tl) for detecting 558.3 keV gamma rays resulting from 113Cd(nth,γ)114Cd. Results showed that HPGe is best detector for cadmium detection in PGNAA analysis system and could measure 10ppm/50μSv in liver phantom.

Keywords: PGNAA, Neutron Activations, Gamma Ray Detector, Cadmium, Liver

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P19: Hybrid Phantom Applications to Nuclear Medicine

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Abstract

Every year too many people are irradiated for diagnostic and therapeutic purposes all over the world. On the other hand, assessment of radiation dose and its related risks to patients is an important aim in radiation protection dosimetry. When we acquire knowledge about the amount of received doses to the body, we will be able to find the new methods for decreasing the absorbed dose. These cumbersome calculations of absorbed and effective doses are now possible with the help of anthropomorphic computational models of human body called phantoms and Monte Carlo codes (MCNP). Latest type of phantoms is hybrid phantom which has been introduced in 2007. Hybrid phantoms retain both the anatomic realism of voxel phantoms and the flexibility of mathematical phantoms. The absorbed dose can be evaluated for any specific patient before individual subjected to radiation exposure by using Hybrid phantoms. Then the energy of emitted particles and irradiation geometry can be determined for any special purpose.

The aim of present study is to construct Hybrid phantoms along with other countries for Iranian patients to be used in different applications such as testing new radio drugs or cancer treatments with high LET radiation.

Keywords: Hybrid phantoms, Radiation Protection Dosimetry, MCNP Monte Carlo Code, Absorbed Dose

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P20: Moderating Features of Nuclear Graphite, a Monte Carlo Study

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Abstract

Lightweight, excellent thermal stability at high temperatures, mechanical strength, high purity, low neutron absorption cross section, having high moderating ability and low production costs" this features of graphite are caused extensive use of this material in various industries, particularly in the nuclear industry. Among these features, the most important features for use in nuclear reactors are having the high moderating ability and low cross section for neutron absorption

In this study, beam properties of high purity graphite are studied using Monte Carlo simulation and performance of this sample are evaluated for using as neutron moderator.The results and compare of discussed properties show