



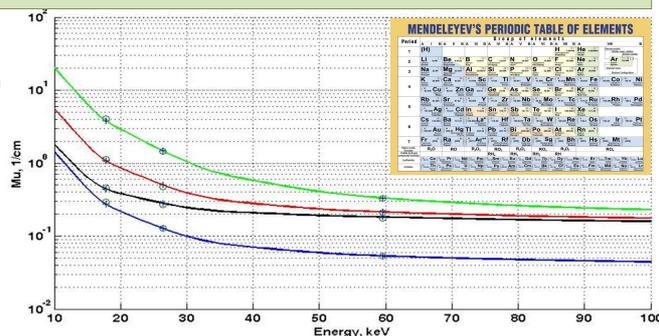
# APPLICATION OF ADVANCED COMPOSITE MATERIALS IN THE CREATION OF REFERENCE VOLUME SOURCES OF RADIONUCLIDES ACTIVITY

Measurements  
and Dosimetry -  
Metrology and  
Dosimetry  
Standards

## ADVANCED COMPOSITE MATERIALS

### Features

- Correspondence with structure of human body and its organs (anthropomorphism)
- Tissue equivalence to biological tissues
- Uniformity of distribution of components and activities by volume
- Chemical inertness and stability
- Hygienic in comparison with samples of biological tissues
- Making models by molding;
- Possibility of introduction of required activity of radionuclides
- Certificate of Russian State Standard



## REFERENCE MATERIALS

### REFERENCE VOLUMETRIC SAMPLES OF ACTIVITY

Density of material imitating  
environmental samples :  
0,15 – 2,5 g/cm<sup>3</sup>  
of samples of core:  
2,5 - 3,8 g/cm<sup>3</sup>  
of samples of metal:  
7,5 - 8,2 g/cm<sup>3</sup>



While making the volumetric  
samples of activity it is necessary  
to ensure their maximum possible concordance with the  
measured sample by the geometric and physical-  
chemical characteristics such as: shape, size, density,  
mass absorption coefficient of X-ray and gamma  
radiation, the distribution of activity.

### HUMAN BODY PHANTOM

#### Type of phantom

• The background phantom not  
containing the radionuclide organs  
models, is intended for measuring the  
absorbed doses of X-ray, bremsstrahlung  
and gamma radiation in organs and  
tissues of the phantom from external  
ionizing radiation sources using  
thermoluminescent detectors (TLD)  
installed in the special pits

• The radionuclide phantom containing  
the radionuclide organs models is  
used for calibrating spectrometers of human  
radiation



## MEASURING INSTRUMENTS

### GAMMA AND BETA SPECTROMETERS



Gamma and beta radiation  
spectrometers are intended for:  
- measuring  $\gamma$ -quanta energy range;  
- identification of radionuclides;  
- measuring activity of both natural  
(NRN) and artificial gamma-radiating  
radionuclides in environmental samples  
and other samples.

### WHOLE BODY SPECTROMETERS

Spectrometers of  
human radiation are  
intended for  
measuring  
incorporated gamma-  
radiating  
radionuclides content  
in whole human  
body, in human  
lungs, in human  
thyroid and in other  
organs.

