Reference dosimetric sourses of beta-radiation

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In the Institute of Physical Chemistry of the Russian Academy of Sciences new types of closed therapeutics sources of ionizing radiation with different radionuclides have been made. These sources of radiation are used for ray therapy of tumour diseases of sight, for therapy of trophic ulcers and surface integral ray exposures of patients. A set of Reference dosimetric sources of beta-radiation (RDSR) has been developed to increase the accuracy of measuring doses of beta-radiation for ray therapy and is designed to transfer a unit of an absorbed of beta-radiation to working measuring facilities. The RDSR set consists of sources with the following beta- radionuclides: Tc-99, Sr-90+Y-90, Ru-106+Rh-106, whose values of boundary energies of beta-spectrum range from 0,3 to 3,5 MeV.

The values of the absorbed dose rate range from 20-200 cGy/min, the degree of distribution nonconformity of radionuclides on surface (variation coefficient) does not exceed 10 for all radionuclides besides Tc-99. Sources Tc-99 have ideal distribution of radioactive component, the degree of nonuniformity does not exceed 0,5%.

The reference dosimetric source of beta-radiation is a germetically sealed ampoule made of an aluminum alloy with a respective radionuclides fixed inside. The active substrata of RDSR in made of glass fibber materials, on which different radionuclides, for example, thallium-204, strontium-90 + yttrium-90, ruthenium- 106 + rhodium-106 have been adsorbed.

The developed sources of radiation are characterized by increased service life (at least 5 times as long as that of the sources on organic-film bases) since the applicator base exhibits high radiation resistance. The service life of sources is 5 years, besides sources with Ru-106 + Rh-106 and for Ru-106 is 2 year. The hermetically (sealed) ampoule protects radionuclides from contact with the environment.

The design of sources of technetium-99 is rather simple, they consist of the 30mcm thick Tc-99 foil soldered onto stainless steel substratum.