Photonuclear Technology for Isotope Production

Description:

The novel soft technology for production of isotope Mo-99/Tc-99m, Cu-67, Sc-47, Co-57, W-181, Pt-195m and others with the use of high-energy bremsstrahlung of the electron accelerator has been developed.

Innovative aspect and main advantages:

For the first time the data on photonuclear yield of desired isotopes and impurities in technological target from natural materials of large mass (up to 100 g) are obtained. The technology is based on the use of reliable electron accelerator having the cost and operational expenses substantially lower than the ones of heavy-particle accelerators of same energy and beam intensity. In contrast to reactor technology, the proposed method is free of enriched uranium utilization. The photon reactions produce considerably less “hot” impurities mainly short-lived.

Areas of Application:

Production of isotopes chiefly for nuclear medicine.

Stage of Development:

Study of photonuclear yield of isotopes has been conducted, new technique for computer simulation and optimization of production process developed and verified by experiments. The equipment for high-energy and high-intensity gammas generation and diagnostics as well as experimental target stations designed. The prototypes of Mo-99/Tc-99m, Cu-67, W-181, Pt-195m and other radionuclide sources have been produced.

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Photos/Pictures

Fig. 1. Electron accelerator LU-40m with energy up to 100 MeV

Fig. 2. γ-spectrum of high-purity W-181 source produced under photonuclear technology