TOMSK POLYTECHNIC UNIVERSITY

National Research Tomsk Polytechnic University

IRRADIATION OF YTTRIUM MICROSPHERES AT THE IRT-T REACTOR

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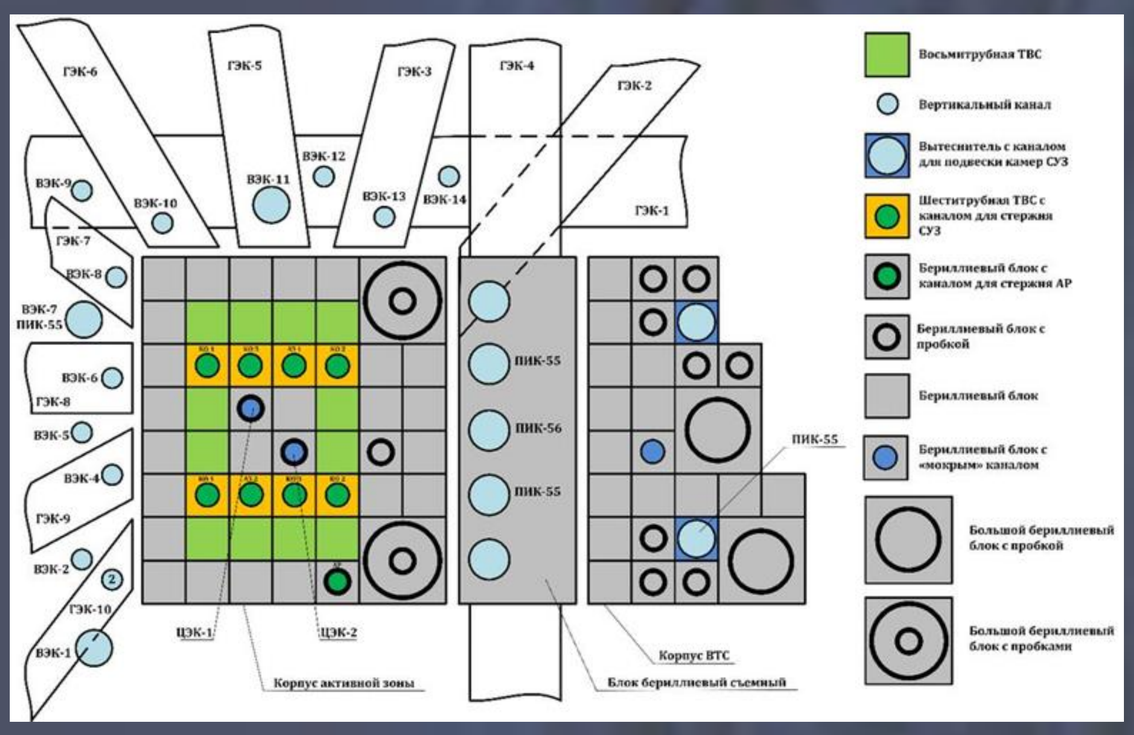
General view of the IRT-T reactor

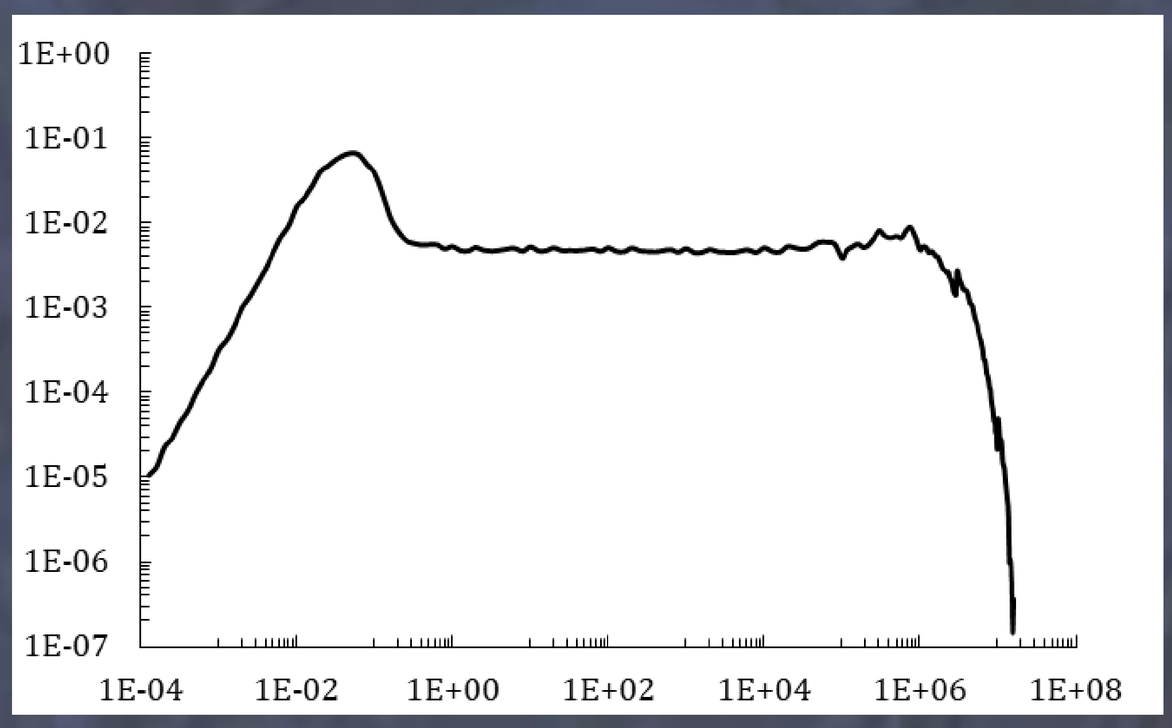


Channel scheme

Considering the results given in [Mokrov Yu.G. Method for obtaining actinium-225. Patent No. 2666343], the time to achieve equilibrium accumulation of actinium-227 in a thermal neutron radiation field of $1.5 \cdot 10^{14}$ cm-2s-1 is ~150-180 days. With a two-stage target irradiation scheme, with the initial radium isotope 226, in a medium-flow reactor, actinium-227 will be extracted for further production after continuous irradiation for 150-180 days. The condition under which the equality of the masses M(229Th) = M(228Th) is observed will be achieved with a total irradiation duration of up to 500 days. The estimated time of target irradiation to achieve the appropriate conditions is typical for the initial target from radium metaplumbate.

Tomsk Polytechnic University has a unique scientific facility, the IRT-T reactor, whose characteristics allow simultaneous short-term and long-term irradiation of a wide range of isotopes. It is possible to irradiate targets containing radium-226 in order to obtain actinium-227, thorium-229, and targets made of actinium-227 for the production of thorium-229. Irradiation of targets from actinium-227 requires the implementation of a two-stage irradiation scheme, in which actinium-227 is extracted from irradiated initial targets containing radium-226. According to the operational characteristics of the IRT-T reactor, the production of the target daughter isotope-227 is similar to the results obtained at the BR-2 (Belgium), LVE-15 (Czech Republic) reactors

IRT-T core



Neutron spectrum in the experimental channel

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