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A tungsten neutron-generating target of a neutron source based on a subcritical assembly driven with an electron accelerator

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In a subcritical assembly, heavy metals are used to generate additional photo-neutrons using high-energy electrons. One of the options for a neutron-generating target is a set of tungsten plates coated with tantalum. It is promising due to the high neutron yield upon irradiation with high-energy electrons.

The operating conditions of a tungsten target exposed to electron beams with an energy of 100 MeV, a pulse beam current of 600 mA, and a power density of 2.5 kW / cm² impose high demands on the target's tightness, in terms of the release of radioactive products from tungsten to the cooling target water.

To protect against chemical corrosion and the ingress of radioactive products of the irradiated material into cooling water, the tungsten target plates are coated with a protective layer of tantalum. The tungsten target worked on a high-energy electron accelerator for 6 months. No radioactive products were detected in chilled water.

Funding Agency

Footnotes

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Yes

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