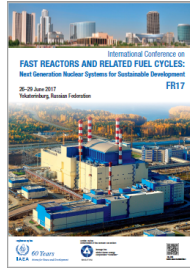


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## The study of U-232 accumulation in reprocessed uranium for fast reactor fuel cycle

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One of the main objects of fast reactor nuclear fuel cycle radiation safety is fuel assembly handling. In case of closed nuclear fuel cycle fresh fuel assemblies will be produced from regenerated uranium and plutonium.

Uranium-232 is produced and accumulated in fuel assemblies during the irradiation. One of the U-232 decay products is Tl-208 which emits high energy gamma radiation. In addition, uranium-232 can't be chemically separated from reprocessed uranium. Thereby, the uranium-232 content in reprocessed fuel is very important for fuel cycle radiation safety.

The main ways of uranium-232 production are  $(n,2n)$  and  $(n,3n)$  reactions on several nuclides. Their contribution to U-232 production depends on their initial content in the fuel. These reactions have neutron energy threshold about 1 MeV.

The difficulty of calculating uranium-232 accumulation is caused by threshold reactions cross sections uncertainties. The evaluation of these cross sections in different libraries can vary by an order or even more.

The paper presents the results of the study into the effect of reaction cross section uncertainties in some modern nuclear data libraries on uranium-232 content and dose rate for reprocessed uranium in fuel assemblies. Fuel cycle scenarios with different fuel compositions, irradiated fuel cooling and fresh fuel storage before irradiation time are considered.

### Country/Int. Organization

JSC "SSC RF –IPPE", Obninsk, Russia

**Author:** Mr KRIACHKO, Mikhail (Joint Stock Company "State Scientific Centre of the Russian Federation – Institute for Physics and Power Engineering named after A. I. Leypunsky")

**Co-authors:** Mr KHOKHLOV, Gennady (JSC "SSC RF –IPPE", Obninsk, Russia); Ms LEVANOVA, Marina (JSC "SSC RF –IPPE", Obninsk, Russia)

**Presenter:** Mr KRIACHKO, Mikhail (Joint Stock Company "State Scientific Centre of the Russian Federation – Institute for Physics and Power Engineering named after A. I. Leypunsky")

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