

Uranium-plutonium mixed fuel for the Central African solar power station



Overview

What is materials science & fuel technologies of uranium & plutonium mixed oxide?

Materials Science and Fuel Technologies of Uranium and Plutonium Mixed Oxide offers a deep understanding of MOX properties for nuclear fuels that will be useful for performance evaluation. It also reviews fuel property simulation technology and an irradiation behavior model required for performance evaluation.

How is nitride uranium-plutonium fuel produced?

Since 2010, all stages from laboratory studies to industrial implementation have been completed, including the development of equipment prototypes. The unique automated experimental complexes allowing to produce nitride uranium-plutonium fuel in the conditions of completely drained nitrogen inner-box atmosphere are created.

Can uranium fuel be shipped in a type Af container?

In fresh uranium fuel, the isotope of interest is U235 and the associated A 2 value for this radionuclide is unlimited, which allows fresh fuel to be shipped in a Type AF container. Conversely, Pu239 has an “A2 ” value of 2.7×10^{-2} Ci. This low A 2 limit forces MOX fuel to be transported in a Type B container.

How much uranium dioxide is in a fuel?

In general, the fuel contains between 3% and 5% PuO₂ blended with 95%-97% natural or depleted uranium dioxide (Carbajo et al., 2001). The small fraction of PuO₂ slightly changes the thermophysical properties of the fuel compared with those of the UO₂ fuel.

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Investigations of Mixed Uranium-Plutonium Nitride Fuel in ...

The complex program of computational and experimental validation of dense fuel for fast reactors in Project Breakthrough provides for testing of fuel rods with mixed uranium ...

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Mixed Oxide Fuels

Mixed oxide (MOX) fuel is a blend of reprocessed uranium, plutonium, and depleted uranium, which behaves similarly to the enriched fresh uranium feed for which most nuclear reactors ...

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Frontiers , Cation interdiffusion in uranium-plutonium mixed ...

2 Nuclear Plant Innovation Promotion Office, Japan Atomic Energy Agency, Oarai-Machi, Japan The diffusion phenomena in uranium-plutonium mixed oxides $U_{1-y}Pu_yO_2$...



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Fabrication and reprocessing of mixed uranium ...

The unique automated experimental complexes allowing to produce nitride uranium-plutonium fuel in the conditions of completely drained nitrogen inner-box atmosphere are created.



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Thermogravimetric study of mixed uranium-plutonium fuel

...

The use of mixed uranium-plutonium nitride fuel in fast reactors allows for a breeding ratio (BR) ≥ 1.06 with a rejection of the uranium blanket as well as the possibility of ...



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Experimental justification of a pyrochemical technology for



The developed scheme for pyrochemical processing of mixed uranium-plutonium nitride fuel includes the following basic operations (Fig. 1): high-temperature treatment by ...

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When plutonium oxide (PuO_2) is mixed with uranium oxide (UO_2), the resulting mixed oxide can be fabricated into fuel suitable for loading into thermal reactors and fast ...



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Certain Aspects of Using ^{15}N -Enriched Mixed Uranium-Plutonium ...

The production of ^{14}C and tritium can be greatly diminished by substituting in mixed uranium-plutonium nitride fuel highly concentrated ^{15}N for naturally occurring nitrogen ...

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Multiphysics Thermo-Mechanical Behavior Modeling for Annular Uranium

Abstract. A model for fuel performance of annular uranium-plutonium mixed oxide (MOX) fuels in lead-cooled fast reactors is developed. This model has several modules ...

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