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The actinide oxides preparation by thermal denitration

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Pyrochemical, hydrometallurgical and combined (pyro + hydro) technologies for reprocessing of mixed nitride uranium-plutonium fuel are under development in RUSSIA now. The main product of hydrometallurgical and combined processing is a mixed U, Pu and Np oxides.

The following technologies of actinides oxides preparation have been investigated for the choice of most promising: precipitation of oxalate, plasma and flame denitration, microwave denitration under as well as precipitation by ammonium or hydrazine. The samples of oxide types U-Th and U-Pu have been got and the following oxides properties have been identified: bulk density, specific surface, fractional composition, the chemical content uniformity and oxygen ratio. Microwave denitration was chosen for the future development on a base of previous studies results.

The preparation of actinides oxides by microwave radiation was performed in two stages. During the first stage the nitric-acid solution of actinide was evaporated to the mixture of uranium trioxide, hydrated plutonium oxide and hydrated neptunium oxide. During the second stage, the calcination of actinides was made in Ar-H₂ atmosphere. The obtained dioxide is grinded into powder mechanically.

The full-scale pilot setup was made.

Country/Int. Organization

Russian Federation

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