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Development of innovative fast reactor nitride fuel in Russian Federation: state-of-art.

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The nitride fuel is selected as an advanced fuel for fast reactors in Russia. Within the framework of "PRORYV" project a comprehensive program of calculation-experimental study of mixed uranium-plutonium nitride performance for BN-1200 and BREST-OD-300 reactors has been developed. The program provides for works to improve the fabrication technique, composition and structure of nitride fuel, to measure out-of-pile properties, to carry out reactor tests in the MIR, BOR-60 research reactors and in the BN-600 commercial reactor, as well as post-irradiation examination (PIE) of all experimental fuel assemblies (FA). Reactor tests are accompanied by pretest calculations by DRAKON and KORAT fuel codes.
For the nitride fuel fabrication the carbothermal synthesis technology of nitride oxide powders, which are the product of the current radiochemical industry, is used. The laboratory technique of carbothermal synthesis of starting powders developed at JSC "VNIINM" is implemented on a larger scale at JSC "SCC" in Seversk, where the possibility of full-scale production of experimental FAs of BN-600 reactor is created. Nitride fuel pellets have been fabricated for more than 500 fuel pins for all BN-600 experimental FAs. Today 9 FAs are under irradiation in the BN-600 reactor. PIEs of one FA have been completed.
7 dismountable FAs with 7 nitride pins in each are under irradiation in the BOR-60 reactor. Fuel and fuel pins have been fabricated at JSC "VNIINM".
All BOR-60 and BN-600 experimental nitride fuel pins are intact.

Country/Int. Organization

Russian Federation

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