

# INVESTIGATION OF THE SOLUBILITY OF ACTINIDE FLUORIDES FOR THE CHOICE OF A SALT SOLVENT FOR A MOLTEN-SALT REACTOR-BURNER OF MINOR ACTINIDES

*Thursday 21 April 2022 10:40 (2 hours)*

Characteristics of the molten-salt reactor-burner (MSR-burner) of minor actinides (MA), which are concentrated in spent nuclear fuel of power reactors, depend significantly on the physical-chemical properties of the fuel composition. In particular, the MA transmutation efficiency is mainly determined by the concentration of actinide fluorides in the molten-salt fuel composition [1]. In this regard, the theoretical and experimental research of the actinide fluorides solubility in the molten-salt solvent to justify the choice of the molten-salt fuel composition is a relevant task.

In Russia, fluoride salt systems based on LiF-BeF<sub>2</sub> [2] and LiF-NaF-KF [3] are considered as basis of molten-salt fuel composition. The purpose of this work is an experimental determination of the solubility of actinide fluorides and their simulators in these fluoride salt systems.

This report presents the procedures for the experimental research of the actinide fluorides solubility in fluoride salt systems, such as thermal analysis method by cooling curves, differential scanning calorimetry, elementary analysis. The working out of these techniques was carried out by the determining individual solubility of NdF<sub>3</sub> and CeF<sub>3</sub> in salt solvents under investigation. Satisfactory agreement of experimental data with literature ones was obtained.

The results of calculating of different MSR-burner versions and the analysis of literary data were used for determination of characteristic compositions of molten-salt fuel mixture. Temperature dependencies of individual solubility of actinide fluorides and simultaneous solubility of actinide fluorides and their simulators in investigated molten salt solvents were obtained, and the elemental composition of molten salt samples was determined.

## Country/Int. organization

Russian Federation

**Author:** САННИКОВА, Полина

**Co-authors:** Мг САННИКОВ, Илья; Мг ЗАЙКОВ, Юрий; Мг ХМЕЛЬНИЦКИЙ, Дмитрий; Мг БЕЛОНОГОВ, Михаил

**Presenter:** САННИКОВА, Полина

**Session Classification:** Poster Session

**Track Classification:** Track 3. Fuels, Fuel Cycles and Waste Management