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SELECTION OF CARRIER SALT FOR MOLTEN SALT FAST REACTOR

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The salt compositions based on the fluorides of alkaline elements (Li, Na, K) have all the necessary properties for the reliable molten-salt reactor operation. Currently available information on the molten salts properties allows to make some recommendations for the choice of the carrier salt for the fast MSR of the different types. The high solubility of the actinide and lanthanide fluorides in FLiNaK combined with its other physical and chemical characteristics allows to consider it as the perspective one for the fast MSR with U-Pu fuel cycle
The choice of the carrier salt for the molten salt reactor (MSR) is discussed. The special attention is paid for the solubility of PuF3 in these salts which is necessary for the fast molten salt reactor with U-Pu fuel cycle (U-Pu FMSR) operation. It is shown that the PuF3 solubility, UF4 and AmF3 in the eutectic LiF-NaF-KF (FLiNaK) at 700°C is ˜ 30, 45 and 40 mole%, respectively. This result opens the way for the development U-Pu FMSR with closed nuclear fuel cycle as well as the effective reactor-burner of minor actinides. The viscosity, corrosive activity and other properties of the molten fluoride salts are outlined.

Country/Int. Organization

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