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MOLTEN SALT REACTOR KINETICS: AN OVERVIEW

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The Molten Salt Reactor (MSR) is one of the IAEA Generation IV concepts of perspective nuclear reactors. A reactor of this type is currently under construction at the Mining and Chemical Combine (Zheleznogorsk, Russia) which determines the relevance of research in the field of molten salt reactors.

The paper considers a type of the reactor that contains a liquid salt fuel that also serves as a coolant for the reactor core. The mentioned solution is contained in the primary loop where it circulates through the core directly to the heat exchanger. The difference between the model of point kinetics of the MSR and the models of solid fuel light water reactors due to the presence of circulating fuel is considered. The main difference is the concentration of the delayed neutrons precursors since the circulated fuel emits neutrons both in the reactor core and outside it which significantly affects the heat release. It is noted that the density of fission neutrons affects transient processes more significantly in MSR compared to reactors of other types. Another difference is the amount of reactivity required to maintain the steady state, and for Molten Salt Reactors it is higher than zero and can vary for different types of fuel [1].

Point kinetics studies for MSR are essential in terms of nuclear safety due to its contribution in the development of the power control systems based on point dynamics models [2].

REFERENCES

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