MODELING THE EVAPORATION OF POTASSIUM–SODIUM MIXTURES AT HIGH TEMPERATURES

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Alkali metal alloys are of interest for the nuclear technology since they can be used as liquid metal coolants in nuclear power plants, so it is necessary to know their properties in a wide region of liquid states, including near the evaporation region at high temperatures.

This work is devoted to the study of incongruent evaporation of binary mixtures of alkali metals within the framework of a simple equation-of-state model. Calculations are carried out using equations of state for the components of the mixture, on the basis of which the properties of melts of a given composition are determined. To find the boundary of the region of evaporation and condensation, a system of three equations is solved, obtained from the conditions of mechanical, thermal and chemical equilibrium during the phase transition. In the paper, the results of calculations for potassium–sodium mixtures of various quantitative compositions are presented.

The proposed model of the equation of state of mixtures can be used to simulate high-intensity processes in multicomponent media at high temperatures.