COMPUTER SIMULATION OF THE THERMOPHYSICAL PROPERTIES OF THE RADIOACTIVE GRAPHITE-CO$_2$ SYSTEM

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The thermophysical properties of the equilibrium system of radioactive graphite-carbon dioxide calculated by means of the program complex TERRA [1]. The main contribution to the thermophysical properties of the condensed system contributes carbon to the temperature of its combustion (973 K). At temperatures over 973 K the thermophysical properties of the system are determined by the vapor phase. On the basis of the obtained data highlighted 4 main temperature ranges in which happen changes of the thermophysical properties of the system. The change of thermophysical properties of the system in the temperature range from 373 to 673 K, presumably associated with the beginning of the reaction $U_3O_{5(cond.)}+4CO_2=3UO_3^-+4CO^++$CO. The change in the thermophysical properties of the system in the temperature range from 673 to 973 K is due to the course of the reaction $U_3O_{5(cond.)}+4CO_2=3UO_3^-+4CO^++$CO and the disappearance of condensed C. The change in the thermophysical properties of the system in the temperature range from 973 to 2573 K is linear and is determined by the vapor-gas phase. The change in the thermophysical properties of the system in the temperature range from 2573 to 3273 K is due to the course of the reaction $U_3O_{5(cond.)}+4CO_2=3UO_3^-+4CO^++$CO.

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1. Barbin N.M., Sidash I.A., Terentev D.I., Alekseev S.G. Computer modeling of thermal processes with calcium, strontium and cesium radionuclides when radioactive graphite is heated in the carbon dioxide atmosphere. Izvestia Vysshikh Uchebnykh Zawedeniy. Yadernaya Energetika, 2017. No. 1. P. 73-82.