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Simulation of ultrahigh-pressure short-arc xenon discharge plasma and effect of evaporation of cathode material on plasma properties INDJIRA MUKHARAEVA, VLADIMIR SUKHOMLINOV, Saint-Petersburg State University, GEORGES ZISSIS, Universite Toulouse III Paul Sabatier, NIKOLAI TIMOFEEV, DMITRIY MIKHAYLOV, Saint-Petersburg State University, ALEXANDER MUSTAFAEV[1], Saint Petersburg State Mining University, PASCAL DUPUIS, SAS Toulouse — High-pressure discharges in rare gases (Ar, Kr, and Xe) are widely used for developing sources of intensive optical radiation. However, one can argue that a number of problems remain unexplored and primarily the possible presence of electrode material atoms in the discharge due to the high discharge current density and a considerable heating of electrodes. These atoms usually have a lower ionization potential in comparison with rare gas atoms and hence can affect the plasma processes. Earlier experimental data led to results that could not be interpreted disregarding the emission of thorium (e.g. from a cathode) in the discharge gap. Modeling of the plasma in question in a simplified geometry also showed a strong influence of thorium atoms on the electrokinetic plasma. The present study is aimed at the development of the model of the short-arc xenon discharge plasma at a high pressure including the influence of thorium atoms on the plasma properties. The spatial distributions of the plasma temperature, electric field strength, densities of thorium atoms, and densities of thorium and xenon ions were obtained.

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