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A model-based analysis of plasma parameters and compositions in HBr mixed with Ar, He or H_2 ALEXANDER EFREMOV, VLADIMIR SVETTSOV, Ivanovo State University of Chemistry and Technology — In this work, we carried out the study of steady-state plasma parameters, active particles kinetics and densities in HBr/Ar, HBr/He and HBr/H2 plasmas under the conditions of dc glow discharge (30–120 Pa, 20 mA) excited in a cylindrical (r = 0.9 cm, l = 40 cm) reactor using the 0-dimensional self-consistent model. The set of equations included: 1) The Boltzmann kinetic equation without accounting for both electron-electron collisions and the second-order impacts; 2) The plasma conductivity equation; 3) The balance equations for neutral and charged particles; 4) The quasi-neutrality conditions for densities of charged particles and for their fluxes to the reactor wall. The output parameters were electron energy distribution function (EEDF), mean electron energy and drift rate, transport and kinetic coefficients of neutral and charged species, their volume-average densities and fluxes. It was found that the dilution of HBr by any mentioned additive gas influences plasma chemistry through the electron impact kinetics due to the changes in both electron density and rate coefficients. The last results from the deformation of the EEDF and increasing mean electron energy.

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