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Numerical analysis of fundamental properties in helium dc glow discharges at sub-atmospheric and atmospheric pressure AKINORI ODA, TAKASHI KIMURA, Graduate School of Engineering, Nagoya Institute of Technology — Fundamental discharge properties in helium dc glow discharges at sub-atmospheric and atmospheric pressure have been simulated using a self-consistent one-dimensional fluid model, which is composed of the continuity equation for electrons, ions, excited atoms and molecules, the Poisson equation, and the energy balance equation for electrons and helium gas. The range of gas pressure is set to be from 50 Torr to 760 Torr in this study. From simulation results, with an increase in gas-pressure up to atmospheric-pressure, dominant positive ion species changes He^+ at 50 Torr to He_2^+ at the gas-pressure greater than 200 Torr, due to rapid increase in reaction rate of the charge-transfer collision process; $He^+ + 2He \rightarrow He_2^+ + He$. The gas-pressure dependence of the spatial profiles in the charged species density, the electric field and the gas temperature will be also discussed at the conference.

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