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Influence of gas heating on atmospheric-pressure dc glow discharge[1] FUMIYOSHI TOCHIKUBO, KENICHI KITANO, YUSUKE NAKAGAWA, SATOSHI UCHIDA, Tokyo Metropolitan Univ — DC atmospheric-pressure glow discharge (APGD) using noble gas is one of easy methods to obtain a nonequilibrium plasma at atmospheric pressure. It can be applied to glow discharge electrolysis with stable plasma-liquid interface(1). We investigated the structure of DC APGD along helium flow in nitrogen by 2D simulation(2). In that work, the gas flow was calculated first without APGD, and then the APGD was calculated under the calculated local gas composition. In the real DC APGD, Joule heating of gas will strongly influence the discharge structure and the local plasma chemistry. In this work, we carried out the coupled 2D simulation of gas dynamics and DC APGD in nozzle-plate electrode geometry with helium flow from the nozzle in nitrogen. The body force and Joule heating from charged particle motion are considered in the gas dynamics, and the local gas composition and gas temperature are included in the APGD simulation. The body force due to positive ions in cathode fall region accelerated the gas flow. The gas temperature in the positive column exceeds 1000 K, which is confirmed from the rotational temperature of N_2 2nd positive band. (1) F. Tochikubo et al., Jpn. J. Appl. Phys. **53** (2014) 126201. (2) F. Tochikubo et al., APEX **4** (2011) 056001.

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