

Abstract Submitted
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Fractional abundance of negative ions in dc glow discharge in contact with solution K. SASAKI, R. HOSODA, N. SHIRAI, Hokkaido University, F. TOCHIKUBO, Tokyo Metropolitan University — We examined negative ion species in a dc helium glow discharge produced in the air. The detection of negative ions was based on laser photodetachment. We injected tunable laser pulses into the discharge. The laser pulse produced electrons from negative ions by photodetachment, which resulted in the pulsed increase in the discharge current. The experimental results indicate a linear relationship between the increase in the discharge current and the amount of electrons produced by photodetachment. We obtained the knowledge on negative ion species by scanning the laser wavelength around the photodetachment threshold. The dominant negative ion was O^- when the plasma was produced between a needle anode and a planar metal cathode, and a small amount of O_2^- and OH^- was observed. We observed significant increase in the OH^- density by changing the cathode to an electrolyte solution. The O^- density also increased in the electrolyte-cathode discharge. According to the cross-section data, it is speculated that the major production process of OH^- is dissociative electron attachment to H_2O_2 . In addition, we detected Cl^- when the cathode was an NaCl solution.

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