ELECTRON TEMPERATURE AND PLASMA DENSITY OF AR PLASMA IN ATMOSPHERIC PRESSURE MICRO-DBD

Pradoong SUANPOOT[1], Jirapong SORNSAKDANUPHAP[1], Bhagirath GHIMIRE[2], Young June HONG[2], Guangsup CHO[2] and Eun Ha CHOI[2]

[1]*Maejo University Phrae Campus,*
17 Moo 3, Maesai Sub-district, Rongkwang District, Phrae Province 54140, Thailand

[2]*Charged Particle Beam and Plasma Laboratory,*
Department of Electrical and Biological Physics, and Plasma Bioscience Research Center,
Kwangwoon University, Seoul 139-701, Korea

e-mail: suapoot@gmail.com

A model based on plasma propagation velocity has been recently developed to estimate the electron temperature (T_e) of atmospheric pressure μ-DBD plasma. In this work, we have extended this model to calculate T_e for plasma generated with Ar gas. Plasma has been generated by input discharge voltage of 2.7 kV at driving frequency of ≈ 45 kHz. A high-speed single-frame intensified charged coupled device (ICCD) has been used to observe the space and time-resolved discharge images and estimate the value of plasma propagation velocity (u_g). The value of u_g for Ar plasma has been obtained in the range of 6.2×10^3 m/s. The electron temperature have been calculated for this plasma. The average electron temperature has been found to be about 1.18 eV and the average plasma density has been found to be about 3.62×10^{14} cm^{-3} for Ar plasma. Our results obtained with modified convective-wave packet model can be a new contribution to plasma medicine.

Keywords : Atmospheric-pressure μ-DBD plasma, Ar plasma, plasma propagation speed, electron temperature, plasma density