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Electric probe measurements of inductively coupled $Ar/O_2/Ar$-O_2 plasmas: comparison by the interpretation methods of the probe data[1]

TAE HUN CHUNG, MIN WOO SEO, Dong-A University — Properties of low-pressure inductively coupled argon, oxygen, and Ar-O_2 mixture plasmas are investigated using an rf-compensated Langmuir probe measurement. In each gas discharge, the electron energy probability function (EEPF), the plasma density and the electron temperature were obtained by using the probe. The estimates of plasma density determined by using different methods to interpret the probe current-voltage curve are compared. The results show a good agreement between the plasma density values measured in ion saturation current at the floating potential and values measured using other classical methods. Especially, in low-pressure oxygen discharges, the plasma density determined from OML theory compares well with the densities obtained by other methods. At high rf powers, the measured EEPFs for argon, oxygen, and Ar-O_2 mixture plasmas were observed to be Maxwellian in the pressure range of 1 - 40 mTorr. The electron temperature was observed to decrease with increasing power and pressure and observed to remain not much changed with increasing Ar content in Ar-O_2 plasmas.

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Tae Hun Chung
Dong-A University

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