

Abstract Submitted
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Generation and Diagnostics of Microwave Discharge Expanding Nitrogen Plasma TOMOHIKO SHIBATA, KAZUYUKI YOSHIDA, ATSUSHI NEZU, HARUAKI MATSUURA, HIROSHI AKATSUKA, Tokyo Institute of Technology — We examine a microwave discharge expanding nitrogen plasma on its vibrational and rotational temperatures (T_v , T_r) by using optical emission spectroscopy (OES), and on its electron density and temperature by using a double probe. In the present study, we generated microwave discharge plasma in a cylindrical quartz tube (26 mm i.d.) and the plasma flowed and expanded rapidly into a rarefied gas wind tunnel with its pressure 2.6×10^{-3} torr. The microwave output power was set at 300 W. The gas flow rate was set at 300 ml/min. In OES measurement, we measured the band spectra of 1stPS and 2ndPS. We compare the experimentally measured spectrum with the calculate one to determine T_v and T_r of the generated plasma. Electron temperature did not reduce monotonically, which is due to complicated energy relaxation process contributed by metastables or vibrational levels. Intensity of 2ndPS decreased more rapidly than that of 1stPS, which is considered to be mainly due to the lowering of T_e . We found different way of variation in T_v of 1stPS and that of 2ndPS.

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