

Abstract Submitted
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Properties of linear microwave plasma sustained by coaxial TEM waveguide MOON-KI HAN, KWON-SANG SEO, DONG HYUN KIM, HAE JUNE LEE, HO-JUN LEE, Department of Electrical Engineering, Pusan National University, Busan 609-735 — A linear 2.45GHz microwave plasma sustained by coaxial circular TEM waveguide has been developed for the low temperature large area plasma enhanced chemical vapor deposition application. TE-TEM microwave power coupling was achieved by copper rod located at $\lambda_g/4$ from short-end of TE₁₀ waveguide. TEM waveguide consists of quartz tube surrounded by plasma and copper rod electrode. TEM waveguide is 60 cm in length and 3 cm in diameter, which is terminated with shorted metal cap. For the operation condition of 300 W input power and Ar pressure of 200 mTorr, a clear standing wave pattern with wavelength of 10 cm was observed. Measured plasma density and temperature at 5 cm from quartz wall was $1.2 \times 10^{17}/\text{cm}^3$ and 1.7 eV respectively. Density non-uniformity was less than 6% along quartz tube in spite of standing wave set-up. In addition, properties of the microwave source are also investigated through electromagnetic field simulation coupled with drift-diffusion approximation of plasma. Calculated and measured standing wave pattern was almost identical. Electron density and temperature distribution show similar behavior with experimental results. S₁₁ value of input port of TE₁₀ waveguide was calculated as 17dB.

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