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Atmospheric microwave plasma system using hybrid resonant structures HOYOUNG SONG, University of Colorado, JUNG MI HONG, KEUN HO LEE, PSM INC, JIN JOO CHOI, Kwangwoon University — Cold atmospheric pressure plasmas have the potential to replace many traditional vacuum-based plasma processing practices as well as opening up entirely new plasma applications. An atmospheric microwave plasma system with power up to 6 kW and frequency of 2.45 GHz has been designed and constructed using 3D FEM code. Mode analysis, resonant condition, and dimension of the cavity have been carefully designed and investigated to optimize the resonant structure. The system consists of a hybrid coaxial cavity structure which couples magnetically into the central cavity. The microwave plasma was reliably sustained up to atmospheric pressure with good uniformity. The density of radicals increased with increasing pressure. The atmospheric microwave plasma presented in this paper can be applied to various applications which require high rate and large area material processing. It provides more effective and competitive process compared to the conventional low pressure plasma systems.

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