

Atmospheric Pressure Microwave Plasma System and Its Applications

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Abstract : A 2.45GHz microwave plasma system and its few applications have been developed. Argon and helium plasma is produced by metallic nozzle and also in a quartz tube at atmospheric pressure, using WR-340 waveguide and its tapered version. The waveguide applicator is also simulated in HFSS and field patterns are analyzed for maximum power absorption in the load. The system is tuned to operate at less than 10% reflected power. Various experimental techniques are used to initiate and sustain the plasma at atmospheric pressure. Plasma of atmospheric air is also produced without using any other shielding gas. The plasma flame is also characterized by its spectrum. Spectral analyses of plasma flame can be used for online analysis of combustion gases produced in industry. The applications of the system include glass and quartz processing, vitrification, emission spectroscopy, plasma coating. Low pressure plasma applications of the system include intense UV light for water purification and ozone generation.

Keywords : HFSS high frequency structure simulator, Microwave plasma, UV ultraviolet, WR rectangular waveguide

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