

Abstract Submitted
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PFC Abatement Using Microwave plasma source with annular-shaped slot antenna at sub-torr pressure¹ SEUNGIL PARK, SUNG-YOUNG YOON, CHANGHO YI, SEONG BONG KIM², SEUNGMIN RYU, JAESUNG OH, SUK JAE YOO, National Fusion Research Institute — We present a feasibility study of a microwave plasma source with annular-shaped slot antenna for abatement of PFCs gas from semiconductor manufacturing processes. According to the company's requirements, the concept of this plasma source could be designed to have a cylinder-shaped metal reactor with quartz tube, an annular-ring resonator with an annular-shaped slot antenna, and a microwave components. In order to investigate the concept of this source, the prototype device was designed to maximize an electric field in the reactor for the breakdown using the 3D finite element method (FEM) code and fabricated with the inner diameter of 100 mm. The argon plasma was generated in the pressure range from 0.04 to 4 torr by the commercial magnetron with the power of 1 kW and the frequency of 2.45 GHz. The plasma properties such as the argon metastable density and the gas temperature have been measured by a tunable diode laser absorption spectroscopy (TDLAS). By using this plasma, destruction and removal efficiencies (DRE) over 90% for CF₄ were achieved with the additive gases by a quadrupole mass spectrometry (QMS). In this paper, the initial design and the preliminary experimental results of a new microwave plasma source would be discussed

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