Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

OES-Measurement on the spatial distribution of the Ar(1s5) population density in a 2f-CCP KAZUKI TAKAHASHI, TOMIHITO OHBA, TOSHIAKI MAKABE — Capacitively coupled plasmas (CCPs) are generally used for SiO2 etching processes. The application of RF-power to both electrodes of a CCP (2f-CCP) provides advantages for the operation. Optical emission spectroscopy (OES) is widely used as noncontact method to determine plasma parameter. Ar metastables play an important role for the characteristics as a probe of active dissociated molecules (radicals). Since metastables are non-emissive species, their population density can not be directly evaluated from OES. In the present study we measured Ar(1s5) population densities by using the combinations of line intensity ratios emitted from upper states and the escape factor of radiation trapping, following Schulze et al. [J. Phys. D: 41 (2008), 065206]. Abel inversion is used to resolve the spatial distribution. Due to diffusion, the spatial distribution of the Ar metastable density is different from the density of the short-lived resonance states. We show that there exists a density of Ar(1s5) in front of the side wall as expected. We focus on the spatial distribution of the Ar(1s5) density and discuss its behavior compared with Ar(2p2).

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Date submitted: 11 Jun 2009 Electronic form version 1.4