

Abstract Submitted
for the GEC05 Meeting of
The American Physical Society

Optical emission CT for an effect of LF-bias voltage on a 2f-CCP for etching TAKUMI AKAIKE, TAKESHI OHMORI, KENJI HAYASHI, MIKIO ISHIMARU, Keio University, TAKESHI KITAJIMA, National Defense Academy, TOSHIAKI MAKABE, Keio University, KEIO UNIVERSITY TEAM, NATIONAL DEFENSE ACADEMY TEAM — It is essential to control and optimize 2-dimensional ion velocity and radical distributions under a strong sheath dynamics in front of an oxide wafer biased deeply by a low frequency source in a 2f-CCP, because high energy ions have a responsibility for oxide etching in RIE. In our previous work, we have performed a design of the functional separation in a 2f-CCP sustained at VHF and biased at LF source. Experimental evidence was limited to a low bias voltage of the LF at the wafer[1]. In this work, by using the CT image of the optical emission from the short-lived $\text{Ar}(2p_1)$ and $\text{Ar}(2p_9)$ as the probe of the transport of electrons with energy greater than 13.48 eV and 1.53 eV, we spatiotemporally investigate the influence of the high voltage LF bias on the 2f-CCP in Ar. The degree of a collapse of electrons from the bulk plasma at the instantaneous anode phase, and that of an ionization growth of the secondary electrons emitted at the wafer by high energy ions at the instantaneous cathode are experimentally shown in the CT images as a function of 2D space and time.

[1] T.Kitajima, Y.Takeo, N.Nakano and T.Makabe : J. Appl. Phys. 82, 5928 (1998)

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Date submitted: 13 Jun 2005

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