Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Characteristics of electron heating and confinement and their changes by means of phase delay in push-pull concept CCP source MYUNG-SUN CHOI, SEOK-HWAN LEE, GON-HO KIM, Seoul National University, DOUNGYONG SUNG, Samsung Electronics — Individual control of ion energy and flux and their species is most desired technique in plasma processing for modern dry etching technology. The ion flux is proportional to the plasma density which can be controlled by applied RF power. The ion energy is proportional to the sheath potential which depends on the amplitude of RF voltage on the electrode. The dissociation rates of gas species are closely related with the electron energy distribution. Dual frequency capacitively coupled plasma (CCP) sources are typically used to control ion bombardment energy and ion flux individually, but it cannot control the electron energy distribution independently. The push-pull concept of CCP source were developed for individual electron energy distribution control which applied very high frequency RF power on top and bottom electrodes with some phase delay. In the push-pull powered source, since the electrical response of plasma is distorted due to the phase delay of power between the top and bottom electrode, electron energy distribution function is modified by means of balance between heating and confinement. This work investigates the changes of heating and confinement and their mechanism by means of phase delay in the push-pull dual frequency capacitively coupled plasma source.

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Date submitted: 14 Jun 2010 Electronic form version 1.4