Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Analysis of the phase controlled capacitively coupled plasma using triode circuit model[1] MYUNG-SUN CHOI, SEOK-HWAN LEE, GON-HO KIM, Department of Energy System (Nuclear) Engineering, Seoul National University, DOUGYONG SUNG, Mechatronics and Manufacturing Technology Center, Samsung Electronics Co. Ltd. — Phase controlled CCP source is attracted recently for high density capacitively coupled VHF plasma source to enhance their poor plasma uniformity due to standing wave effect by controlling phase difference. And it also enhances process performance. But the phase controlled CCP has hardness of controlling plasma density due to the asymmetry of the curve for plasma density with changing phase and its non-linear drift. To understand these characteristics of phase controlled CCP, this work investigates the effect of wall electrode using triode circuit model and compares with experimental results in 100MHz phase controlled CCP source. Plasma density varies with changing ratio of current flowing through the chamber wall and current flowing between electrodes. The asymmetry of the curve for plasma density with phase is due to the effect of area difference of powered electrodes, and this asymmetry increases with the current flowing through the wall electrode. we are going to report the asymmetry effect of electrodes on the plasma density control of phase controlled CCP and discuss the difference of physical area ratio and effective area ratio of triode CCP source.

[1]This work supported by Samsung Electronics Co. Ltd.

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Date submitted: 15 Jun 2012 Electronic form version 1.4