Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Simulation of Ion Energy and Angular Distribution Functions using a Multidimensional RF Sheath Model KAZUKI DENPOH, Technology Development Center, Tokyo Electron Yamanashi Ltd. — We have developed a novel numerical tool to rapidly and precisely predict the ion energy and angular distribution functions (IEDF and IADF) for an rf sheath formed around an arbitrary surface geometry in a single- or dual-frequency capacitively coupled plasma (CCP). A Monte Carlo method coupled with our multidimensional rf sheath model [1] is utilized to simulate ion trajectories and collisions with neutrals in an oscillating sheath. The IEDF calculated for a one-dimensional sheath in a dual-frequency CCP agreed very well with data measured using the In-wafer Ion Energy Analyzer [2]. We also present the IEDF and IADF obtained for a two-dimensional sheath around a wafer edge and an adjacent focus ring in another dual-frequency CCP to demonstrate the multidimensional capability of the present model. The model should be of practical use for the research and development of semiconductor device manufacturing equipment.

[1] K. Denpoh and T. Shirafuji, Jpn. J. Appl. Phys., 50 (2011), 036001.
[2] M. Funk, et al., presented at 59th Int. Symp. American Vacuum Soc., 2012.

Kazuki Denpoh
Technology Development Center, Tokyo Electron Yamanashi Ltd.

Date submitted: 02 Jun 2015 Electronic form version 1.4