Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Formation of High Energy Oxygen Species in RF Magnetron Sputter Plasma KAZUYA GOTO, TATSUO ISHIJIMA, Nagoya University, TADASHI MORITA, KAZUNAGA ONO, ULVAC Inc., NORIKAZU OHSHIMA, Renasas Electronics Corp., KEIZO KINOSHITA, NEC Corp., HIROTAKA TOYODA, Nagoya University — Radio Frequency (RF) magnetron sputtering is an important tool for thin film sputter deposition such as insulated materials. For example, an insulated oxide thin film used in magnetoresistive random access memory (MRAM) is important to control magnetoresistance. During the sputter deposition process, however, energetic particles induce damage to the deposited film, resulting in the device degradation. Recently, we have reported spatially-resolved measurement of the O^- energy distribution in an RF magnetron plasma using a quadrupole mass analyzer equipped with a electrostatic energy analyzer, where O^- ions up to a few hundred eV were observed with spatial variation of its energy distribution function. Furthermore, O^- energy distributions with a strong energy-dependent structure with periodic peaks as a function of the O^- kinetic energy have been observed. In this paper, origin of the periodic peaks in O^- energy distribution is discussed, based on the energy modulation of O^- ions passing through the sheath in front of the grounded wall. Furthermore, energy distribution of high energy O atoms produced from high energy O^- ions will be also discussed from a Monte Carlo simulation.

Tatsuo Ishijima
Nagoya University

Date submitted: 11 Jun 2010 Electronic form version 1.4