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Spatial variation of O^- Energy distribution in an RF magnetron plasma[1] H. TOYODA, K. GOTO, T. ISHIJIMA, Nagoya University, N. OHSHIMA, K. KINOSHITA, NEC Corporation — Magnetron plasmas are one of the most important tools for sputter deposition of thin films. However, energetic particles from the sputtered target sometimes induce physical and chemical damages to the deposited film surface during the sputtering processes. For example, magnetic and/or electrical properties of magnetic recording films or magnetic tunneling junction for magnetoresistive random access memory (MRAM) are sensitively changed with sputtering condition, suggesting the damage to the deposited film interface. Therefore, measurement of energetic particles in the magnetron plasma is indispensable to improve the deposition process. So far, we have investigated behavior of high energy Ar atoms backscattered from the sputter target, using a quadrupole mass analyzer (QMA) with an energy analyzer. As another possible energetic species in magnetron plasma, oxygen negative ions in oxide targets is known and existence of O^- ions up to a few hundred eV has been reported in YBCO magnetron sputter plasma. In this paper, energy distribution of O^- and their spatial variation in an RF magnetron plasma is measured using a QMA with the energy analyzer. An equivalent circuit model which explains the spatial variation of O^- energy distribution is proposed.

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