

Abstract Submitted
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Surface Roughness Control of DC Sputter Film Deposition by Superposition of VHF Power FUKUI TAKASHI, SUYAMA TAKU, FUKUOKA YUSHI, SASAI KENSUKE, Nagoya University, TOYODA HIROTAKA, Nagoya University, PLANT, Nagoya University — Magnetron plasmas are one of the most important tools for sputter deposition of thin films. However, energetic particles from the sputtered target such as backscattered rare gas atoms or oxygen negative ions (O^-) from oxide targets sometimes induce physical and chemical damages as well as surface roughening to the deposited film surface during the sputtering processes. In our previous work, we have investigated spatial and energy distributions of O^- ion in a RF plasma. We also have shown suppression of O^- energy with VHF-superimposition and that O^- energy can be controlled by a parameter R , which is a ratio of the VHF power to the total input power (VHF power + DC power). In this study, influence of the VHF superposition on the deposition properties of ITO films such as deposition rate, RMS roughness or electrical resistivity is investigated. Deposition rate is strongly influenced by the VHF superposition although the DC current is the same, suggesting variation of sputter yield and positive ion current due to lowering of the target voltage. By superposition of the VHF power up to $R \sim 90\%$, improved RMS roughness and the electrical resistivity is observed.

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