TW-P015

Impedance Characterization of Tantalum Oxide Deposited through Pulsed-Laser Deposition

Kyeong-Woo Kwon[1], Jin-Kwan Jung[2], Chan-Rok Park[1], Jin-Sang Kim[2], Seung-Hyub Baek[2], Jin-Ha Hwang[1]

[1]Department of Mat. Sci. & Eng., Hongik University, Seoul 121-791, [2]Electronic Materials Research Center, Korea Institute of Science and Technology, Seoul 136-791, Korea

Tantalum oxide has been extensively investigated as one of the promising Resistive switching materials applicable to Resistive Dynamic Access Memories. Impedance spectroscopy offers simultaneous measurements of electrical and dielectric information, separation of electrical origins among bulk, grain boundaries, and interfaces, and the monitoring of electrical components. Such benefits have been combined with the resistive states of resistive switching devices which can be described in terms of equivalent circuits involving resistors, capacitors, and inductors, The current work employed pulsed laser deposition in order to prepare the oxygen-deficient tantalum oxide. The fabricated devices were controlled between high-resistance and low-resistance states in controlled current compliance modes. The corresponding electrical phenomena were monitored both in the dc-based current-voltage characteristics and in the ac-based impedance spectroscopy. The origins of the electrical switching are discussed towards optimized ReRAM devices in terms of interfacial effects.

Keywords: ReRAM, Impedance, Pulsed-Laser Deposition

TW-P016

Fabrication and Characterization of Zinc-Tin-Oxide Thin Film Transistors Prepared through RF-Sputtering

Woori-Do, Jeong-Wan Choi, Myeong-Hee Ko, Eui-Hyeon Kim, Jin-Ha Hwang

Department of Mat. Sci. & Eng., Hongik University, Seoul 121-791, Korea

Oxide-based thin film transistors have been attempted as powerful candidates for driving circuits for active-matrix organic light-emitting diodes and transparent electronics. The oxide TFTs are based on the amorphous multi-component oxides involving zinc, indium, and/or tin elements as main cation sources. The current work employed RF sputtering in order to deposit zinc-tin oxide thin films applicable to transparent oxide thin film transistors. The deposited thin film was characterized and probed in terms of materials and devices. The physical/chemical characterizations were performed using X-ray diffraction, Atomic Force Microscopy, Spectroscopic Ellipsometry, and X-ray Photoelectron Spectroscopy. The thin film transistors were fabricated using a bottom-gated structure where thermally-grown silicon oxide layers were applied as gate-dielectric materials. The inherent properties of oxide thin films are combined with the corresponding device performances with the aim to fabricating the multi-component oxide thin films being optimized towards transparent electronics.

Keywords: Zinc-Tin_Oxide, Sputtering, Thin film Transistor