

TW-P032

## Electrical/Optical Characterization of Zn-Sn-O Thin Films Deposited through RF Sputtering

Chan-Rok Park, Moon-Su Yeop, Bo-Ram Lee, Ji-Soo Kim, Jinha Hwang

Department of Mat. Sci. & Eng., Hongik University

Zn-Sn-O (Zinc-Tin-Oxide; ZTO) thin films have been gaining extensive academic and industrial attentions owing to a semiconducting channel materials applicable to large-sized flat-panel displays. Due to the constituent oxides i.e., ZnO and SnO<sub>2</sub>, the resultant Zn-Sn-O thin films possess artificially controllable bandgaps and transmittances especially effective in the visible regime. The current approach employed RF sputtering in depositing the Zn-Sn-O thin films onto glass substrates at ambient conditions. This work places its main emphases on the electrical/optical features which are closely related to the combinations of processing variables. The electrical characterizations are performed using dc-based current-voltage characteristics and ac-based impedance spectroscopy. The optical constants, i.e., refractive index and extinction coefficient, are calculated through spectroscopic ellipsometry along with the estimation of bandgaps. The charge transport of the deposited ZTO thin films is based on electrons characteristic of n-type conduction. In addition to the basic electrical/optical information, the delicate manipulation of n-type conduction is indispensable in diversifying the industrial applications of the ZTO thin films as active devices in information and energy products. Ultimately, the electrical properties are correlated to the processing variables along with the underlying mechanism which largely determines the electrical and optical properties.

**Keywords:** Zn-Sn-O, ZTO, Zinc-Tin-Oxide, RF Sputtering