

TM-P007

Effect of TiO₂ buffer layer on the electrical and optical properties of IGZO/TiO₂ bi-layered films

Tae-Kyung Gong¹, Moon hyun joo¹, Dong-Hyuk Choi², Dong-II Son², Daeil Kim^{1*}

¹School of Materials Science and Engineering, University of Ulsan, Ulsan, 680-749, Korea,

²Dongkook Ind. Co., Ltd. Ulsan, 683-804, Korea

In and Ga doped ZnO (IGZO) thin films were prepared by radio frequency magnetron sputtering without intentional substrate heating on glass substrate and TiO₂-deposited glass substrates to consider the effect of a thin TiO₂ buffer layer on the optical and electrical properties of the films. The thicknesses of the TiO₂ buffer layer and IGZO films were kept constant at 5 and 100 nm, respectively.

Since the IGZO/TiO₂ bi-layered films show the higher FOM value than that of the IGZO single layer films, it is supposed that the IGZO/TiO₂ bi-layered films will likely perform better in TCO applications than IGZO single layer films.

Acknowledgements

This research was financially supported by the Ministry of Education (MOE) and National Research Foundation of Korea (NRF) through the Human Resource Training Project for Regional Innovation (No. NRF-2013H1B8A2032122).

Keywords: IGZO, TiO₂, Figure of merit

TM-P008

Optoelectrical properties of IGZO/Cu bi-layered films deposited with DC and RF magnetron sputtering

Moon hyun joo¹, Oh-jung hyun¹, Dong-II Son², Daeil Kim^{1*}

¹School of Materials Science and Engineering, University of Ulsan, Ulsan, 680-749, Korea,

²Dongkook Ind. Co., Ltd. Ulsan, 683-804, Korea

In and Ga doped ZnO (IGZO) films were deposited on 5 nm thick Cu film buffered Poly-carbonate (PC) substrates with RF magnetron sputtering and then the effect of Cu buffer

layer on the optical and electrical properties of the films was investigated. While IGZO single layer films show the electrical resistivity of $1.2 \times 10^{-1} \Omega \text{cm}$, IGZO/Cu bi-layered films show a lower resistivity of $1.6 \times 10^{-3} \Omega \text{cm}$. Although the optical transmittance of the films in a visible wave length range is deteriorated by Cu buffer layer, IGZO films with 5 nm thick Cu buffer layer show the higher figure of merit of $2.6 \times 10^{-4} \Omega^{-1}$ than that of the IGZO single layer films due to the enhanced opto-electrical performance of the IGZO/Cu bi-layered films.

Acknowledgements

This research was financially supported by the Ministry of Education (MOE) and National Research Foundation of Korea (NRF) through the Human Resource Training Project for Regional Innovation (No. NRF-2013H1B8A2032122).

Keywords: IGZO, Cu, Optoelectrical, Sputtering