

Electrical and optical properties of Al layer inserted ZnO thin films by radio frequency sputtering

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ZnO has been recognized as a promising material that can be used in various semiconductor devices. In this study, ZnO thin films was prepared by radio frequency (RF) sputtering on the glass substrate at room temperature using a ZnO target in pure Ar gas environment. To obtain the high performance transparent conductive oxide(TCO), we have deposited Al layers between the ZnO thin film layers on the glass substrates at the same conditions by RF sputtering. It is made up of three layers of ZnO and two layers of Al. Amount of inserted Al metal is 4.6 weight percentage (1.4 wt%). Also, as-deposited films were post-annealed ranging from 300 to 600°C and then investigated electrical and optical properties. By Hall-effect measurement, the resistivity of the Al layer inserted ZnO films was decreased from $1.5061 \times 10^{-1} \Omega\text{cm}$ to $3.6741 \times 10^{-4} \Omega\text{cm}$. Moreover, we also investigated Photoluminescence (PL) measurement, and photospectroscopy for optical property.