

## **ZnO doping profile effect on CIGS solar cells efficiency and parasitic resistive losses based on cells equivalent circuit**

### **ABSTRACT**

The window layer of the CIGS thin film solar cells plays the role of transparent front contact and the n-side of pn-heterojunction. Thus the variation of window layers electrical and optical properties can affect the cell performance. Properties of Al-doped Zinc oxide (ZnO) thin film as most common used window layer for CIGS solar cells were studied via simulation using the simulation program called SCAPS-1D. This study is aimed to find the effect of ZnO layer doping profile on cell performance. It is found that increasing Al-content up to 5% in ZnO layer will lead to increasing the cell efficiency and will decrease the cell series and shunt resistance.

**Keyword:** CIGS; SCAPS-1D; Thin film solar cells; Window layer; Zinc oxide