MODELLING AND ANALYSIS OF ZINC OXIDE ANTIREFLECTION COATING THICKNESS ON SILICON SOLAR CELLS USING WAFER RAY TRACER

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ARC : Antireflection Coating

ZnO : Zinc Oxide

PV : Photovoltaic

EVA : Ethylene Vinyl Acetate

AM1.5g : Air Mass 1.5 spectra

ABSTRACT

Antireflective coating (ARC) are starting to gained popularity in the market of the solar cells since it has the potential to reduce the optical loss experience by the solar cells. The reflection from the surface of the solar cells without the ARC is approximately 30% and it affected the current density in the cells. The ZnO material has been seen to have a very promising criteria to be a single layer of the ARC so this material have been chosen to be the ARC to see enhancement of the solar cells performance. The layer ZnO ARC is used on top of the solar cell with various thickness which is 60nm, 70nm, 80nm and 90 nm. The optical properties of each thickness have been gained by using a software name Wafer Ray Tracer by PV lighthouse. The data to be analysed are the reflection, absorption and transmission and the current density. The optimum thickness of ZnO that result in the maximum current density will be study in this work. This simulation at the end show that every thickness of the ZnO ARC have their own wavelength that they work at the optimum level but it can be said that it higher the performance of the solar cells without the ARC.