

ABSTRACT

Dye-sensitized dye-based solar cells (DSSC) are widely developed due to their low-cost and simple fabrication processes. Some of the issues that challenge the DSSC fabrication are low efficiency. In this study developed DSSC using monolithic type configuration. The method used is screen printing method and the parameters studied include the effect of variation of ZrO₂ thickness that is 1x, 2x, 3x, and 6x coating and influence of carbon and platinum counter electrode to the efficiency of solar cell. The results of this study were characterized by surface morphological properties and sheet resistance values using SEM, EDS and four point probe respectively. Morphological characterization is done by comparing the morphology of carbon and platinum counter electrodes which show that carbon has a larger particle structure than platinum and see the ZrO₂ material content which shows that there is no material other than Zr, O, and Ti. The result of sheet resistance characterization shows that the average value of carbon resistance is 9,864 Ω / sq and platinum is 10,954 Ω / sq so that the carbon resistance value is lower than platinum. With the lower resistance the better solar cell performance.

The result of I-V characterization gives information that ZrO₂ thickness and counter electrode type have an effect on monolithic DSSC efficiency. By using carbon counter electrode has the highest efficiency at 2x ZrO₂ thickness of 0.039%, while for using platinum electrode counter has the highest efficiency at ZrO₂ 1x thickness of 0.011%.

Keywords: DSSC (Dye Sensitized Solar Cell), Zirconia, counter electrode.