ABSTRACT

Dye-Sensitized Solar Cell (DSSC) monolithic type which has only one substrate developed a lot because of the low price of fabrication and a simple fabrication process. However, low efficiency is one of its weaknesses. One reason is the counter electrode which is used as a layer to increase the conductivity of the FTO glass substrate, not firmly attached to the FTO glass substrate, so that an inter layer is needed that can increase the conductivity of the counter electrode layer and increase the adhesivity between the counter electrode and the FTO glass substrate. In this study, the material of counter electrode was used carbon and the inter layer material was used carbon and TiO2 colloid which functioned as binders. Deposition of each monolithic type DSSC layer is done by screen printing techniques. The first layer of carbon 1 (Inter Layer) has a composition of 0,13 gr graphite, 0,2 ml TiO2 colloid, 0,2 ml Triton 10% and 0,25 ml terpineol and carbon 2 (Counter Electrode) has a composition of 0,5 gr carbon nanopowder, 2 gr graphite powder, 0,3 gr ethyl-cellulose, 0,25 gr TiO2-P25, and 4,25 gr terpineol. The two carbon layers are multiplied by 10 to multiply the resulting paste. Graphite mass at carbon 1 (Inter Layer) varied into 5 variations, namely 0,9 gr (A), 1,1 gr (B), 1,3 gr (C), 1,5 gr (D), and 1,7 gr (E). The five variations each have 3 samples. After fabricated inter layer carbon, soma characterizations were done, like morphological characterization, sheet resistance measurement, adhesivity test and transmittance test and I-V characterization on monolithic type DSCs were fabricated. As a result, in the inter layer carbon morphology characterized using SEM, it was found that the inter layer of sample B had a uniform spread of graphite and only a small amount of carbon agglomeration was seen. In addition, the sheet resistance test using four point probes shows that sample B has a stable Rs with an average of 12,097 ±0,054 Ω/ sq. In the adhesion test, it can be seen that the carbon 1 layer is firmly attached to the FTO glass substrate visually, and in the transmittance test using UV-VIS, sample B has the smallest transmittance ratio between after and before the adhesive test of 1,963. The results of the monolithic type I-V DSSC characterization, obtained the greatest efficiency derived from sample B (2) which has a mass of 1,1 gr graphite on the colloid TiO2 of 1,258%. So that the addition of the inter layer carbon between the carbon electrode counter and the FTO glass substrate can improve the efficiency of the monolithic type DSSC

Keywords: monolithic type DSSC, carbon, graphite