Effect of Physical Treatment in Electrospun TiO_2 Electrode for Dye-sensitized Solar Cell

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One-dimensional (1D) nanostructured metal oxides have attracted much attention because of their unique properties and potential applications in electronics, photonics and other related areas. The electrospinning technique provide a simple, cost-effective approach for producing polymeric and inorganic nanofibers within a broad range of diameters, from tens of nanometres to a few micrometres according to the selection of the processing parameters. Physical treatment process is shown to enhance the adhesion of TiO_2 nanofibers electrospun onto fluorine-doped tin oxide substrates for use in dye-sensitized solar cells. We have evaluated the cell efficiency for J-V characteristic curves by solar simulator. We have found that the best performance is achieved by hot-pressing at 14 MPa. Specifically, a current density of approximately 8.96 mA/cm^2, an opencircuit voltage of about 0.82 V, a fill factor close to 72%, and an energy conversion efficiency of approximately 5.33% were all achieved by this process.

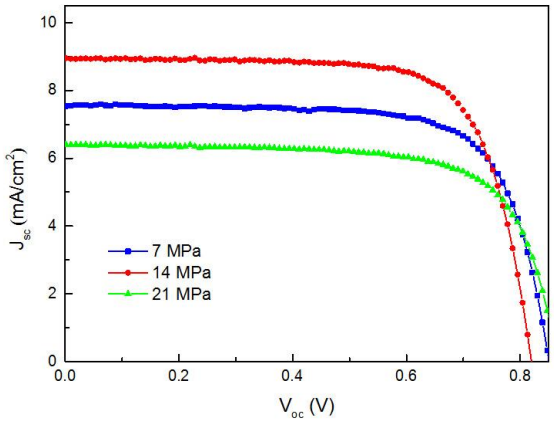

Fig. 1. Current density-voltage characteristics of the DSSC

Acknowledgment

This work was supported by the DGIST R&D Program of the Ministry of Science, ICT and Future planning of Korea (15-EN-03)

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