

Low cost counter electrode for dye-sensitized solar cells using activated coconut shell charcoal with jackfruit latex as the binder

Dissanayake P.N.^{1,2}, Kumara G.R.A.¹, Karunaratne D.G.B.C.¹, Kumarasinghe K.D.M.S.P.K.¹ and Sirimanne P.M.^{2*}

¹National Institute of Fundamental studies, Hanthana Road, Kandy, Sri Lanka

²Department of Science and Technology, UvaWellassa University, Passara Road, Badulla, Sri Lanka

Dye sensitized solar cells (DSSCs) belong to the third generation photovoltaic cells, can also be used to convert visible light into electrical energy. In this type of DSSCs, counter electrode plays a vital role in photovoltaic performance. As the manufacturing cost of platinum electrodes are very high the present study proposes to fabricating an electrode using activated coconut shell charcoal bonded with jackfruit latex. Coconut shells were fired and activated by sending steam at 900 °C. Prepared activated charcoal powder was mixed with jackfruit latex solution and sprayed on top of a FTO glass plate to fabricate a counter electrode. Photo-performance of TiO₂|dye|electrolyte (I⁻/I₃⁻) form solar cells were studied in this work using Mercurochrome as the dye. Maximum efficiencies of 1.845% and 1.384% were achieved for platinum and activated coconut shell charcoal bonded with jackfruit latex electrodes, respectively.

Keywords: coconut shell, jackfruit latex, solar cell and electrode

*Corresponding author: psirimanne@hotmail.com