Section E1

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A double layered co-sensitization in dye sensitized solar cells (DSSCs) by using natural pigments

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The co-sensitization method is employed in dye sensitized solar cells (DSSCs), with the aim of improving the absorption of light over a border wavelength region and thereby to improve the current output of the devices and the overall efficiency. In this work, natural pigments from the fire fern leaves and begonia black velvet leaves were used for double layered co-sensitization in dye sensitized solar cells (DSSCs). UV-VIS Spectral data revealed that both dyes were anthocyanins. The co-sensitization was done by first adsorbing the dye from begonia black velvet on to a TiO_2 electrode by dipping, and then by removing the adsorbed dye of the top layer of TiO_2 using a de-sorption solution. After that the fire fern dye was allowed to adsorb. The best performance was exhibited by the co-sensitized cell which showed conversion efficiency (η) of 1.2%, with open circuit voltage of 412.9 mV, short circuit current density of 5.08 $mAcm^{-2}$ and fill factor of 57.2%. This performance is superior to that of either individual devices made from fire fern (η=0.96%) and begonia black velvet (η=0.87) under the same conditions of fabrication.

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