

Abstract Submitted
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Tandems of solid dye-sensitized solar cell with carbon nanotubes interlayer¹ CHAO-CHEN YUAN, JIANGBIN XIA, ANVAR ZAKHIDOV, Univ. of Texas at Dallas NanoTech Institute — The light-to-electron conversion efficiency of the dye-sensitized solar cell (DSC) was recently improved up to 11.1%. However, this efficiency is not sufficient for cost-effective commercial production, so the expansion of the absorption region of the solar cell is needed. For transparent carbon nanotubes, parallel-connected tandem DSCs is developed. Novel parallel type of tandem cell structure is created. We create a parallel combination for cells using different dyes. The top cell is transparent and the bottom cell only uses light passing through the top cell. Instead of a common platinum counter electrode as interlayer, we use transparent carbon nanotubes (CNTs) coated on hole transport layers of each sub-cell, as an interlayer counter electrode. With high enough conductivity and high optical transparency, the compatibility of CNTs work as the interlayer counter electrode performing even better than Pt. The short-circuit current density (J_{sc}) for the tandem cell is demonstrated to be higher than that of separate the front and back photo electrodes. A model using light energy absorbed by the photo electrode is N719 top cell and a black-dye bottom cell is developed. Now the prototype of DSC tandem cell has been proved with the efficiency of 0.293% with 0.2 cm² area.

¹The novel material as an interlayer for tandem cell - Carbon nanotubes

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