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Dye-Sensitized Photovoltaic Cells with Enhanced Exciton-Hole Separation and Barrier Characteristics GLENN GRISSOM, UTRGV Physics Dept, MIGUEL LEAL, MOHAMMED UDDIN, UTRGV Chemistry Dept, AHMED TOUHAMI, UTRGV Physics Dept — Over the last 30 years dye-sensitized solar cells have received considerable interest due to their low-cost, environmental sustainability, and numerous practical applications. Carbon nanotube based dye-sensitized solar cells have become a main focus of research. Flexible Carbon nanotube-yarn based photo voltaic cells are advancement over metal wire based cells or non-flexible substrates, such as Fluorine doped Tin Oxide glass as a foundation for dye-sensitized solar cells. Carbon-nanotubes have a great advantage in photo voltaic cells due to their low electrical resistance, excellent electrocatalytic activity, and high mechanical integrity. Here, we introduce the use of poly(3-hexylthiophene-2,5-diyl) and [6.6] Diphenyl C_{62} bis(butyric acid methyl ester) combination as a quantum dot sensitizer in conjunction with the dye N719 to increase electron generation, decrease electron-hole pair recombination, and enhance barrier characteristics. Our prototype 3-Dimensional Photovoltaic Cells show an increase in photon to energy conversion efficiency together with prolonged environmental sustainability.

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