Abstract Submitted
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Hybrid Tandem Solar Cells: CIGS/DSC with Carbon Nanotube Interlayer ANVAR ZAKHIDOV, UTD-Nanotech Institute, WILLIAM SHAFARMAN, Institute Energy Convertion, University of Delaware,, MEI ZHANG, UTD-NanoTerch Institute, SHAOLI FANG, UTD-Nanotech Institute, RAY BAUGHMAN, UTd-Nanotech Institute, TX75070 — Multi-junction solar cells enable harvesting of wider regions of the solar radiation spectrum leading thereby to increased overall efficiencies. We present here a first study of a hybrid monolithic structure composed of *dye sensitized solar cells (*DSCs) with thin film inorganic CIGS. We have created several architectures of monolithic multi-junction cells and address fundamental connectivity issues by using sheets of strong, transparent carbon nanotubes (T-CNTs) recently produced at UTD [1] as a uniform interlayer platform. Free-standing T-CNT networks can be laminated onto any surface and their advanteges as transparent interlayers in tandems is shown here for a tandem in which a un-finished CIGS (top ITO is absent) is coated by T-CNTs. Such CIGS with T-CNT shows Voc=0.6 V and Isc $\sim$ 10 mA/cm2. It has been combined with DSC playing role of a photoactive counter-electrode, with iodine based electrolyte and Ru-dye on TiO2 mesoscopic electrode. The tandem demonstrated Voc= 0.82 V, which is higher than Voc of our sole DSC-CNT and Isc= 1mA/cm2, smaller than photocurrent of single DSC due to unbalanced current. The physics of processes of charge recombination in hybrid tandems is discussed . [1] M. Zhang, S. Fang, A. Zakhidov, S. B. Lee, A. Aliev, R.H. Baughman, ***Science,*** 309,(2005) 1215

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