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Dye Sensitized Solar Cells with bilayer Multi/Single Carbon Nanotubes ZHARKYNAY KUANYSHBEKOVA, ANVAR ZHAKHIDOV, Nano Tech Institute UTD — In this presentation, we demonstrate the fabrication of dye sensitized solar cells using bilayers of MWCNT coated by SWCNT on top. Each DSC cell uses a typical titania photoelectrode deposited onto a transparent window electrode with photosensitive dye absorbed on the surface of the TiO₂. Adding SWCNT layer to MWCNT increased short circuit current from 10 to 14 mA/cm². Conventional DSC uses counter electrode with Pt coated FTO, the Pt layers play role of catalyst for better charge transfer rate from electrolyte. In our bilayer electrode MWCNT sheet play a role a good conductor (similar to FTO), while SWCNT provide better catalytic properties for charge transfer (similar to Pt). The relatively high obtained efficiency of DSS (~7-8%) cell is determined by the high generated photocurrent, which is comparable to the reference DSS made by same method using the standard PT catalyst. However, the fill-factor of the device is still low (~0.4-0.5). Therefore further improvement of electrical conductivity of these carbon based electrodes is under investigation with CNT sheets to achieve high performance device. We acknowledge the help with transparent SWCNTs made in A.Nasibullin of Aalto University (Finland).

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