Effect of oriented 1D TiO_2 structures as anode buffer layer on the performance of ZnO based hybrid solar cell

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One-dimensional TiO2 nanorod was grown on the Fluorine doped tin oxide (FTO) substrates by the hydrothermal process. The length of the nanorod and their orientation were achieved by changing the temperature or duration of synthesis and by altering the water: acid concentration. The optimal conditions to grow high quality 1D TiO2 nanorod were selected. ZnO based nanostructures were grown by seed layer based growth technique on top of this TiO2 layer. The hybrid solar cell device were fabricated by spin or dip coating regioregular poly(3-hexylthiophene) (P3HT) on top of the ZnO nanostructures. Device was also fabricated by introducing TiO2 thin film as anode buffer layer instead of TiO2 1D structures. We study the charge transport, and quantum efficiencies of these two types of devices in order to understand effect of TiO2 nanorod on the performance of ZnO based hybrid solar cells.