

Solution-processed semitransparent p-n GO:CNT/ZnO heterojunction diodes for visible-blind UV sensors

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A high quality transparent p-n heterojunction diode composed of a vertical array of 1-D ZnO NRs and a very thin 2-D GO:CNT hybrid film was fabricated through a solution based process. Optical measurements revealed that the UV absorption of the ZnO NRs increased after a GO:CNT hybrid film was spray-coated onto the NRs. As a result, the device exhibited a high response to UV illumination. The fabricated p-n diode displayed high rectifying characteristics and acted as an excellent visible-blind UV sensor. The turn on voltage and ideality factor of the diode were 1.5 V and 6.1, respectively. From the results of this study, it is expected that a heterostructure of 1-D arrays and 2-D carbon-based nanomaterials can provide new design opportunities in transparent optoelectronic devices. Further investigation on the effect of GO:CNT ratio and aspect ratio of ZnO NRs is required to optimize the device performance.