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Photoresponse in large area multi-walled carbon nanotube/ polymer nanocomposite films PAUL STOKES, JIANHUA ZOU, LEI ZHAI, QUN HUO , SAIFUL I. KHONDAKER, University of Central Florida, Nanoscience Technology Center, Department of Physics, Chemistry, Materials and Areospace Engineering — Recently, photoresponse of CNTs (both in visible and near infrared (NIR) regime) have generated considerable debate in terms of whether the photoresponse is (i) due to photon induced charge carrier (excitonic), (ii) due to heating of the CNT network (bolometric), or (iii) caused by photodesorption of oxygen molecules at the surface of the CNT. In addition, the role of the metal electrode – CNT contact’s effect on the photoresponse has also been debated. Here, we will present near IR photoresponse study of large area multi-walled carbon nanotube/poly(3-hexylthiophene)-b-polystyrene polymer (MWNT/P3HT-b-PS) nanocomposite films for different loading ratio of MWNT in polymer matrix. We show that, compared to pure MWNT film, there is a large enhancement of photocurrent in MWNT/polymer composite film. The photocurrent strongly depends on the position of the laser spot with maximum response occurring at the metal – film interface. The time constant for the photoresponse is slow and varies between 0.6 and 1.2 seconds. We explain the photoresponse of the composite film by Schottky barrier modulation at the metal – film interface and discuss reasons for the slow time response.

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