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Optical limiting by absorption bleaching in carbon nanotube devices: comparison of field induced and electrochemically induced charge injection W. JOSHUA KENNEDY, NASA Johnson Space Center, Z. VALY VARDENY, University of Utah — We studied direct charge injection in a heterogeneous film of single-wall carbon nanotubes using the technique of charge-induced absorption. We found that the injected charges screen the excitons in the semiconducting tubes, reducing their binding energy and transferring oscillator strength from the exciton transitions to free carriers. These effects parallel those of the electrochemical doping in the same samples. Furthermore, we interpret the bleaching bias in the electroabsorption (a χ_3 process) in isolated SWNT as being due to injected charges, which has implications for a variety of SWNT based optoelectronic devices, including nanoscale optoelectronic switches.

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