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Electroluminescence from Carbon Nanotube Network Transistors

ELYSE ADAM, CARLA AGUIRRE, Departement de Genie Physique, Ecole Polytechnique de Montreal, MATTHIEU PAILLET, Departement de Chimie, Universite de Montreal, BENOIT CARDIN ST-ANTOINE, Departement de Genie Physique, Ecole Polytechnique de Montreal, FRANCOIS MEUNIER, Departement de Chimie, Universite de Montreal, PATRICK DESJARDINS, DAVID MENARD, Departement de Genie Physique, Ecole Polytechnique de Montreal, RICHARD MARTEL, Departement de Chimie, Universite de Montreal — A spectroscopic study of the electroluminescence properties of individual carbon nanotube (CNFET) and carbon nanotube network (NNFET) field effect transistors has been performed. As expected, the measurements on metallic and semiconducting CNFET showed that only semiconducting carbon nanotubes produce electroluminescent signals. The narrow emission line widths of CNFET ($\sim$80 meV) compared to that of NNFETs ($\sim$180 meV) indicates that the light emission from carbon nanotube networks involves many carbon nanotubes. Moreover, electroluminescence spectra from NNFETs made from three different sources of carbon nanotubes (laser ablation, CoMoCAT and DWNT) have shown major differences which, based on comparisons with their corresponding absorption spectra, indicate that only larger diameter carbon nanotubes contribute to light emission.

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