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Photoluminescence Imaging of Oxygen Doped Individual Single-Walled Carbon Nanotubes SIBEL EBRU YALCIN, HISATO YAMAGUCHI, Los Alamos Natl Lab, CHARUDATTA GALANDE, Rice University, JARED J. CROCHET, ADITYA D. MOHITE, GAUTAM GUPTA, XUEDAN MA, HAN HTOON, STEPHEN K. DOORN, Los Alamos Natl Lab, LOS ALAMOS NATIONAL LABORATORY COLLABORATION, RICE UNIVERSITY COLLABORATION — Semiconducting single-walled carbon nanotubes (SWNTs) are attractive candidates for near-IR optoelectronic applications. But they show low fluorescence quantum yield. Recent oxygen doping studies have shown that the quantum yield of the excitons can be enhanced by an order of magnitude due to the formation of local 0D sites on the SWNT surface. However, these studies have been limited to ensemble measurements. Understanding the dopant site, exciton migration and trapping dynamics on individual SWNTs is critical for controllably tuning the photo-physical behavior. We have studied ozonated individual (6,5) nanotubes as a function of progressive ozonation. We spatially resolved the pristine and doped state using visible and NIR sensitive cameras. We demonstrate PL imaging as a probe of the emission dynamics as a function of dopant concentration. The spectral studies show the red-shifted emission in the PL of the NTs due to the ozonated site.

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