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Confocal imaging and excitation spectra of photoluminescence from carbon nanotubes suspended over trenches of various widths[1] S. MORITSUBO, T. MURAI, T. SHIMADA, Y. MURAKAMI, S. MARUYAMA, Y. K. KATO[2], University of Tokyo — Carbon nanotubes (CNTs) have novel optical properties, such as strongly bound excitons and sensitivity to surrounding environments, because of their unique structure. In particular, it is well known that CNTs lying on substrates show photoluminescence (PL) quenching caused by very effective substrate-induced nonradiative decay of photoexcited excitons. In this study, we formed trenches with various widths on SiO_2/Si substrates in order to prepare suspended CNTs. Using ethanol as carbon source, chemical vapor deposition was used for the synthesis of CNTs. PL images were collected by a home-built laser-scanning confocal microscope system utilizing a fast steering mirror. In addition, PL excitation spectra were taken using a wavelength tunable Ti:sapphire laser. We analyzed these PL images and excitation spectra in order to clarify the interaction between excitons and the substrate.

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