Materials Science Data Sheet

Division C

Kaiser Science Olympiad Invitational 2026

1 Lab I

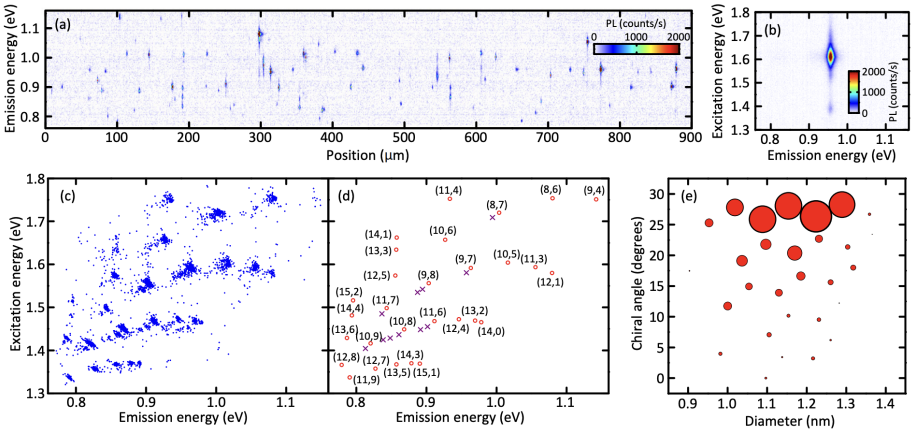

Figure 1: (a) A typical result of a trench scan with $P = 50$ μW and $E_{\text{exc}} = 1.59$ eV. (b) A typical PLE map of a (9,7) nanotube with $P = 1.5$ μW. (c) PLE positions of 3736 individual nanotubes. (d) Averaged peak positions for each chirality. Open circles represent main spots, and cross marks indicate satellite spots. (e) Chirality distribution as a function of tube diameter and chiral angle. The area of the circles represents the population.

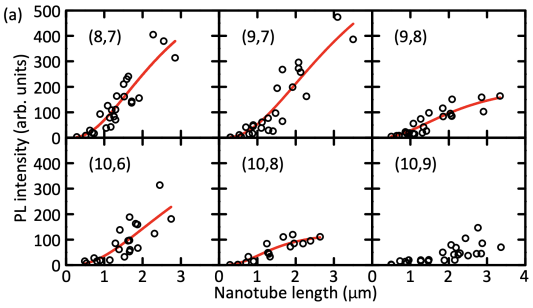

Figure 2: Length dependence of PL intensity at $P = 0.01$ μW for six different chiralities. Lines are fits, and it is not shown for (10,9) because a reliable fit could not be obtained.

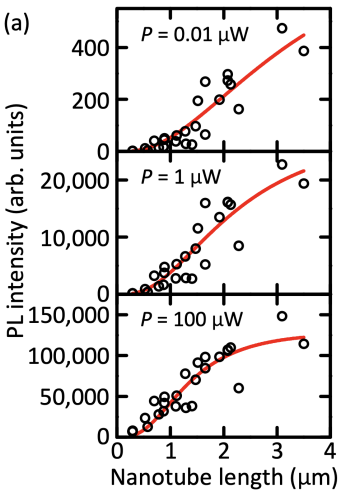

Figure 3: Length dependence of PL intensity for (9,7) nanotubes with $P = 0.01$, 1, and 100 μW. The curves are fits.

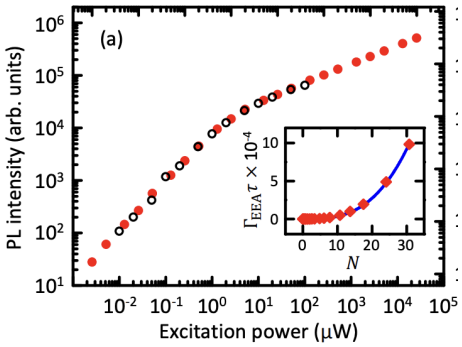

Figure 4: Excitation power dependence of PL intensity for a 0.89-μm-long (8,7) nanotube (open circles) and generation rate dependence of intrinsic

2 Lab II

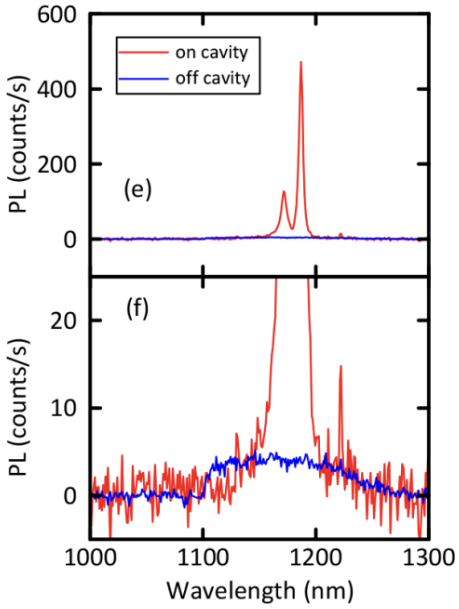

Figure 5: (e) PL spectra taken on the cavity (red) and off the cavity (blue). (f) An enlargged view of the low-intensity region of the data shown in panel e. The long-pass filter with a cut0on wavelength of 1100 nm is used when the off-cavity spectrum is taken.

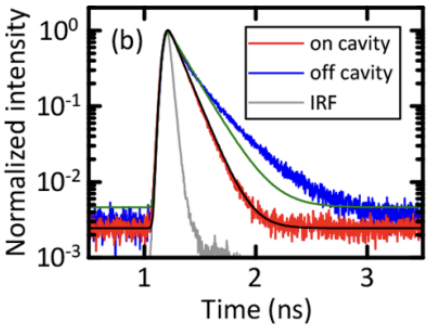

Figure 6: PL decay curves taken with pulsed laser excitation at $P = 0.1$ μW. The red and blue lines are for the on-cavity and typical off-cavity data, respectively. Fits with a convoluted monoexponential decay function are also shown on for on the cavity (black curve) and off the cavity (green curve) data. The gray solid line represents the IRF. A Y-polarized laser is used for excitation. All of the measurements are performed at room temperature.

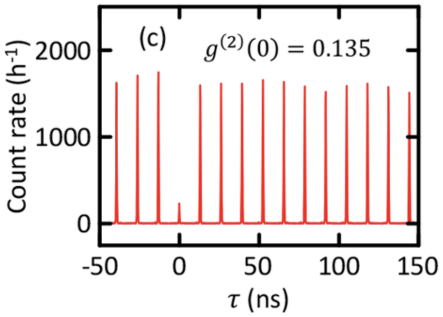

Figure 7: An intensity correlation histogram taken on the cavity at $P = 0.5$ μW. A Y-polarized laser is used for excitation. All of the measurements are performed at room temperature.