Time-Resolved Investigation of Excitation Energy Transfer in Carbon Nanotube-Porphyrin Compounds

: Supporting information

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Transient response of TPP and SWNT for off-resonant excitation

Regarding SWNTs (Figure 1(a)), the transient spectrum excited at 400 nm shows only slight differences compared to the one excited at 445 nm, essentially in the relative amplitude of the different PB peaks. We explain this observation as due to a change of partially resonant conditions in the excitation (i.e. the energetic distance between the pump and the $S_{22}$ or $S_{33}$ resonances depends on the chiral species resulting in a chiral dependent excitation). In any case, the excitation at 400 nm is more off-resonance than at 445 nm, which explains the overall weaker amplitude of the pump-probe signal in Figure 1(a) compared to Figure 9(a) of the article.

Figure 1(b) shows the transient transmission spectra of pristine TPP after excitation at 400 nm. The transient spectrum of TPP is very similar to the one obtained after excitation at 445 nm. This means that pumping on either sides of the Soret band of pristine TPP does not affect the relaxation dynamics to the Q bands (which remains on the order of 100 fs as previously reported\(^1\)) nor the branching of the population decay to the different $Q$ levels. Therefore, the transient spectrum of TPP in the visible is mainly due to the transient response of the Franck-Condon levels of the $Q_x$ state that are indifferently populated whatever the excitation wavelength within the Soret band.

References

Figure 1: Transient absorption spectra for SWNT and TPP in SC pumped at 400 nm (a,b) at two different pump-probe delays (0.2 ps (red line) and 50 ps (black line)). The pump fluence is 300 $\mu$J/cm$^2$. The dashed line is the linear absorption spectrum of the corresponding sample.