Electronic Supplementary Material (ESI) for Nanoscale
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*Supporting Information*

# Highly Efficient Exfoliation of Individual Single-Walled Carbon Nanotubes by Biocompatible Phenoxylated Dextran

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## Effect of centrifugation speed on the quality of SWNTs suspended in SDS, SC, Chitosan, SDBS and P- dextran

Figure S1 shows the UV-vis-nIR absorption spectra of SWNTs suspended in SDS, SC, chitosan, and SDBS after 125,755 g ultra-centrifugation for 4 hours and 40 kDa P-dextran (phenoxy content of 13.6%) after mild-centrifugation at 16,168 g for 1 hour, together with their peak-to-valley ratios after various centrifugation conditions. The quality of the SWNTs suspended in P-dextran after mild-centrifugation (Figure S1, left) is similar to that of the SWNTs suspended in SDS and even higher than those of SWNTs suspended in SC, Chitosan, and SDBS after ultra-centrifugation (Figure S1, right). These results indicate that P-dextran disperses SWNTs more effectively than other dispersants, e.g., SDS, SC, Chitosan, and SDBS and bundles are effectively removed, even under mild centrifugation, i.e., low-energy processing.

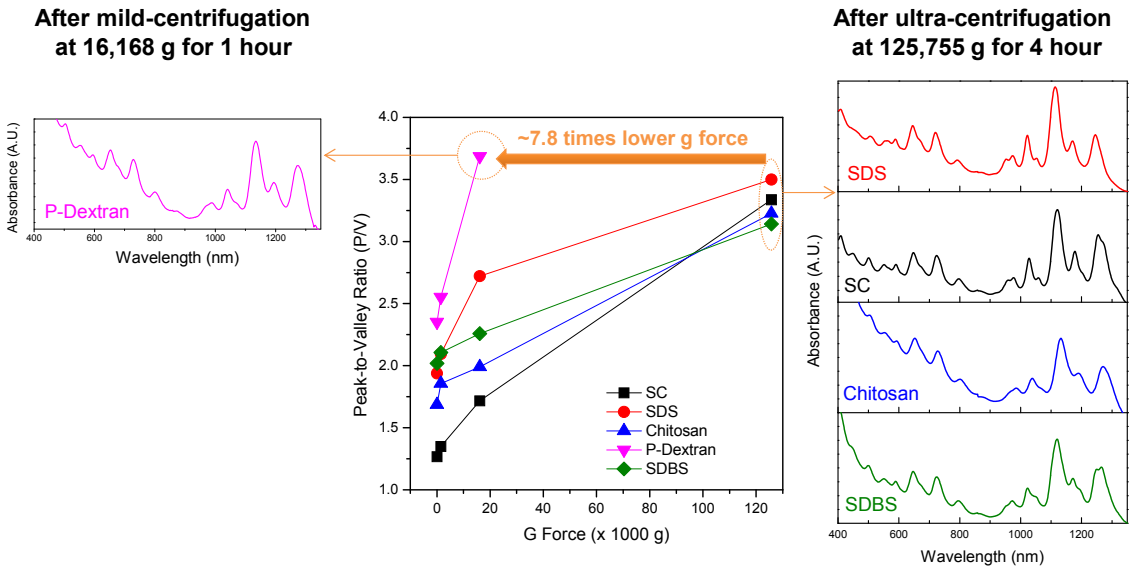


Figure S1. UV-vis-nIR absorption spectra of SWNTs suspended in SDS, SC, Chitosan, SDBS and 40 kDa P-Dextran under various centrifugation conditions.

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**Effect of dextran chain length (molecular weight) on the quality of SWNT suspensions.**

We also compared the effect of the chain length (i.e., molecular weight) of dextran on SWNT suspension quality. Figure S2 shows UV-vis-nIR absorption spectra of SWNTs suspended in 40 kDa, 70 kDa and 150 kDa P-dextran (phenoxy content in all samples are adjusted to 13.6%) before and after mild centrifugation at 16,100 g for 1 hour. The peak resolutions are similar among SWNTs suspended in dextran with different chain lengths (molecular weight 40 kDa, 70 kDa, 150 kDa), indicating that the effect of dextran's chain length on the SWNT suspensions is weaker than that of the phenoxy content.

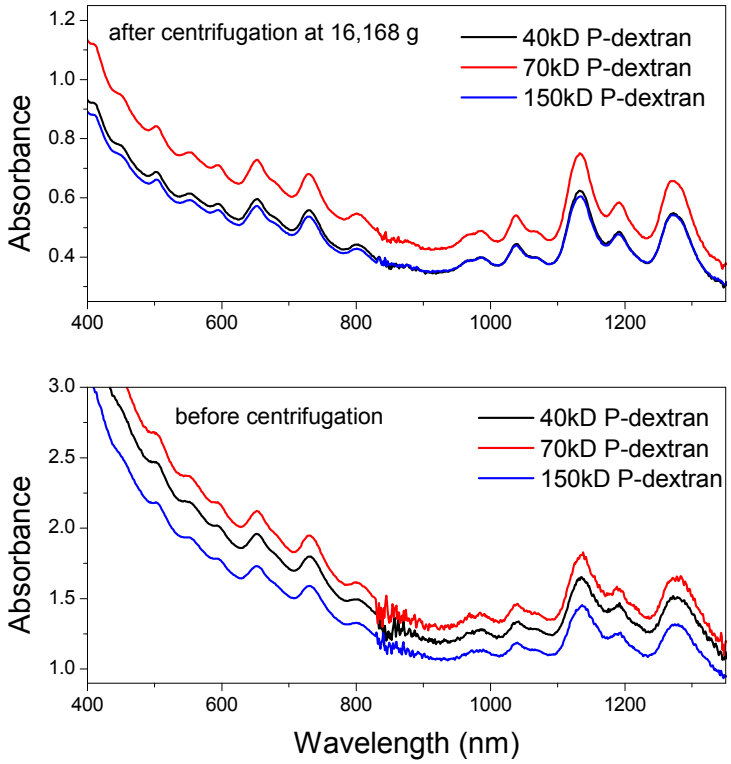


Figure S2. UV-vis-nIR absorption spectra of SWNTs sus-pended in 40, 70 and 150 kDa P-dextran.

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**Effect of dextran concentration on the quality of SWNT suspensions.**

The effect of the concentration of P-dextran in a water solution was also investigated, and the results are shown in Figure S3. The amount (intensity) and peak resolution of individual SWNTs were observed to be maximized when the concentration of P-dextran was in the range of 0.5 ~ 1 wt%.

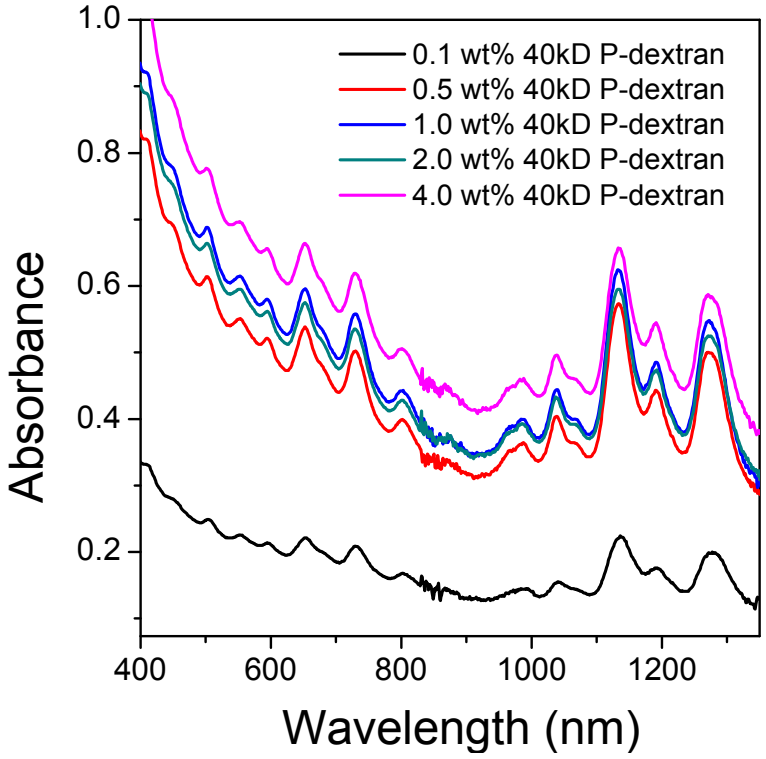


Figure S3. UV-vis-nIR absorption spectra of SWNTs sus-pended in different concentrations of 40 kDa P-dextran.

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## Photoluminescence of P-dextran.

We also performed the fluorescence experiment on P-dextran itself (1 wt% P-dextran solution in water without SWNTs), as shown in Figure S4, to confirm that the dextran species itself does not fluoresce. As can be clearly seen in Figure S4, P-dextran itself is not fluorescent, indicating that fluorescence of P-dextran-suspended SWNTs in Figures 5 and 6 solely originated from SWNTs.

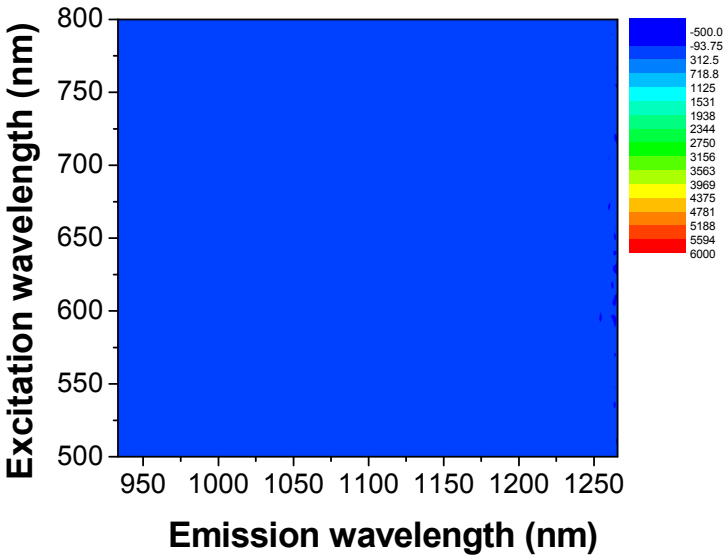


Figure S4. Photoluminescence spectra of P-dextran solution.

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**Fluorescent freeze-dried P-dextran-SWNT suspension.**

We also performed same experiment on a freeze-dried P-dextran-SWNT suspension, as shown in Figure S5, and again observed the SWNTs fluoresce in the solid state.

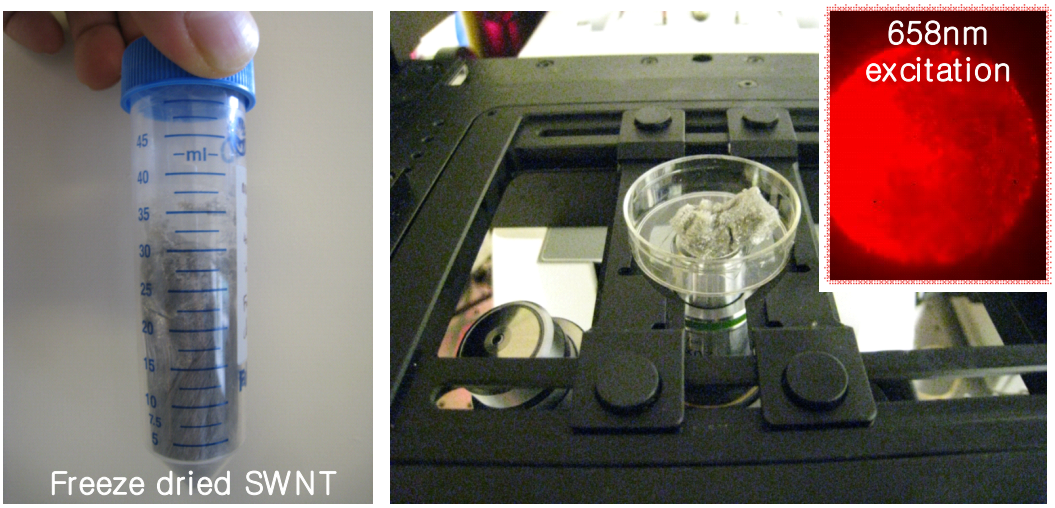


Figure S5. Photograph of freeze-dried phenoxylated dextran-SWNT suspension and its fluorescence image at 658 nm laser excitation.