## ESI

## The Effect of Single Wall Carbon Nanotube Metallicity on Genomic DNA-Mediated Chirality Enrichment

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Figure s2 shows that SaDNA shows consistent (6, 5) chirality enrichment as shown in previous work.<sup>s1</sup> However, further iteration of the SaDNA-mediated separation process is shown to decrease the (6, 5) chirality enrichment (Figure s4). The NIR absorption profiles (Figure s4a) of the fractionated CG65 supernatants from the primary and iterated separation process show relative decrease of (6, 5) NIR spectra (shaded) to the rest of *sem*-tubes after the iteration process. Trace amount of residual *met*-SWNT in the primary (6, 5)-enriched sample is believed to play a significant role in interfering further increase of the (6, 5) separation efficiency. RRS can be one of the best tool to probe the qualitative and quatitative changes in the met-SWNTs. However, high *met*-content in CG200 prevents one to obtain quantitatively enough aqueous CG200-SaDNA supernatant dispersion to measure resonance Raman scattering directly from their drop-cast. Thus, to probe the effect of *met*-tubes throughout the iteration process, we chose a HiPco<sup>TM</sup> sample that exhibits larger and broader diameter distribution and less chirality abundance (stochastic *met:sem* = 1:2) than SG65 and similar diameter distribution to the

CG200. Iterating separation process on the HiPco<sup>TM</sup> sample enables us to obtain a semi-qualitative comparison between *met*- and *sem*-SWNT with a single excitation laserline in RRS. In Figure s4b, the deconvoluted RRS radial breathing mode (RBM) peaks clearly show the persistent presence of *met*-SWNTs (shaded) for a HiPco<sup>TM</sup> SWNT sample that underwent iteration of the SaDNA-mediated fractionation process. Iteration process is briefly described as following. The first enriched supernatants were sonicated at 35% amplitude for 30 minutes, then ultracentrifuged again at 610,000 x g for 60 minutes. The second iteration supernatants were carefully removed without disturbing the precipitate.

**Figure s1.**  $E_{11}^{S}$  PLE emission contour plots from SDS dispersed SG65<sup>TM</sup> SWNTs (a, b) and SDS dispersed CG200<sup>TM</sup> SWNTs (c, d) in the redispersed precipitate and ultracentrifuged supernatant fractions, respectively. PLE peaks are normalized with respect to the maximum intensity SWNT PLE peak for the visualization of relative chirality fractions.



**Figure s2.** E<sub>11</sub><sup>S</sup> PLE emission contour plots from SaDNA dispersed (a) **1:0, (b) 3:1, (c) 1:3, and (d) 0:1 SG65<sup>TM</sup>/CG200<sup>TM</sup> SWNT mixtures** in the ultracentrifuged supernatant fraction. PLE peaks are normalized with respect to the maximum intensity SWNT PLE peak for the visualization of relative chirality fractions.



**Figure s3.** Calculated (a) and actual (b)  $E_{11}^{S}$  NIR absorption profiles of 3:1 SG65<sup>TM</sup>/CG200<sup>TM</sup>SWNT mixture dispersed in SaDNA. Groups of the characteristic NIR  $E_{11}^{S}$  peaks are deconvoluted and assigned with respect to their possible chiralities and indicated as groups in brackets "{}"<sup>s2, s3</sup>. (6, 5) SWNT peaks are shaded for visualization.



**Figure s4.** (a)  $E_{11}^{S}$  NIR absorption profiles of SaDNA dispersed SG65<sup>TM</sup> SWNT in the primary and iterated ultracentrifuged supernatant fractions. (*6*, *5*) SWNT peaks are shaded for visualization. (b) Resonance Raman RBM-bands at a 1.96 eV excitation laser, obtained from as-supplied, primary, and iterated SaDNA mediated separation processed HiPco<sup>TM</sup> SWNTs. Lorentzean-deconvoluted peaks are shaded for *met*-SWNTs and non-shaded for *sem*-SWNTs. Respective SWNT diameter is indicated at the top of each spectrum.



**Figure s5.**  $E_{11}^{S}$  NIR absorption profile from (a) 1:3 and (b) 3:1 SG65<sup>TM</sup>/CG200<sup>TM</sup> ultracentrifuged supernatant fractions dispersed with SaDNA (post-process). Groups of the characteristic NIR  $E_{11}^{S}$  peaks are deconvoluted and assigned with respect to their possible chiralities and indicated as groups in brackets "{}"<sup>s2, s3</sup>. Scheme shows the process of separation, mixing, and characterization SG65<sup>TM</sup>/CG200<sup>TM</sup> SWNT with SaDNA (post-process).



## References

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