Counterion Effect on the Aggregation of Anionic Perylene Dyes and the Influence on Carbon Nanotube Dispersion Efficiencies

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Supplementary Information

Absorption and Emission Spectra

pH = 7

Figure S1: a,c) Absorption and b,d) emission spectra (λ$_{exc}$ = 500 nm) of 1 at different concentrations with a, b) Li$^+$ and c,d) K$^+$ as counterion at pH = 7.
**pH = 11**

(a) Absorption and (b) emission spectra ($\lambda_{\text{exc}} = 500$ nm) of 1 at different concentrations with (a, b) Na$^+$, (c, d) Li$^+$ and (e, f) K$^+$ as counterion at pH = 11.

Figure S2: a,c,e) Absorption and b,d,f) emission spectra ($\lambda_{\text{exc}} = 500$ nm) of 1 at different concentrations with a, b) Na$^+$, c,d) Li$^+$ and e,f) K$^+$ as counterion at pH = 11.
Determination of the cmc from the Evolution of the Emission Intensity at 593 nm

**Figure S3**: Determination of the critical micelle concentration (cmc) from the emission intensity at 593 nm where innerfilter effects are negligible, as outlined in the main text. 

- a) Na⁺, pH = 7
- b) Na⁺, pH = 11
- c) Li⁺, pH = 7
- d) Li⁺, pH = 11
- e) K⁺, pH = 7
- f) K⁺, pH = 11
**Figure S4**: Absorption spectra of SWCNT dispersed by 1 ([1] = 5 x 10^{-5} M) at pH = 7 and pH = 11 with a) Na⁺, b) Li⁺ and c) K⁺ as counterions (perylene transitions). All dispersions have been mildly centrifuged prior to acquisition of the spectra after sonicking SWCNTs (initial concentration of 0.1 g L⁻¹) in aqueous solutions of 1.
**Figure S5**: Absorption spectra of SWCNT dispersed by $\mathbf{1}$ ([1] = $5 \times 10^{-5}$M) at pH = 7 and pH = 11 with a) Na$^+$, b) Li$^+$ and c) K$^+$ as counterions (SWCNT transitions). All dispersions have been mildly centrifuged prior to acquisition of the spectra after sonicating SWCNTs (initial concentration of 0.1 g L$^{-1}$) in aqueous solutions of $\mathbf{1}$. 