Electronic Supplementary Information

IONOPHORE-BASED OPTICAL NANOSENSORS INCORPORATING HYDROPHOBIC CARBON DOTS AND A PH-SENSITIVE QUENCHER DYE FOR SODIUM DETECTION

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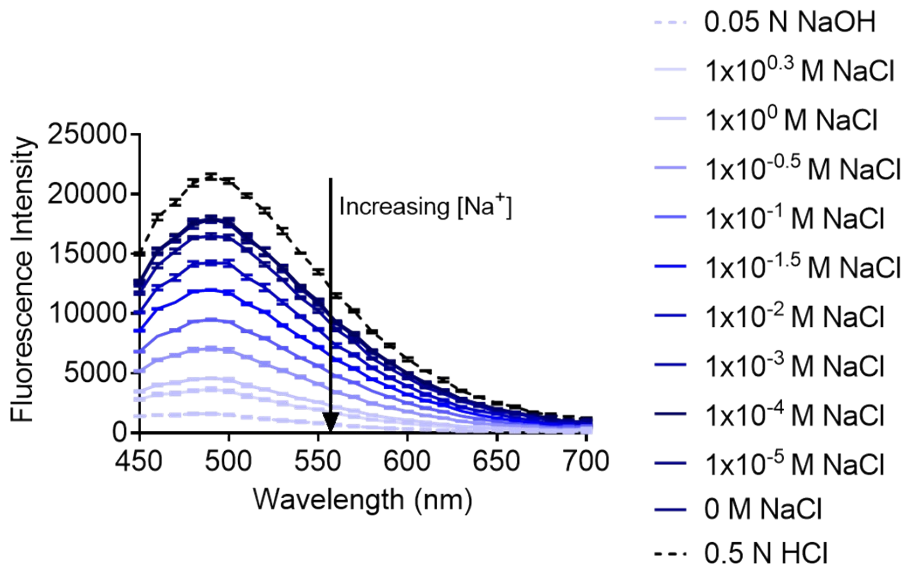

Figure S-1. Labeled plot of **Fig. 4** in main text. Emission spectra of Blueberry-CD nanosensors at 420 nm excitation in 0.05 N NaOH, 0.50 N HCl, and a range of NaCl concentrations in buffered HEPES/TRIS (pH 7.4). Error bars represent SD (n = 3).

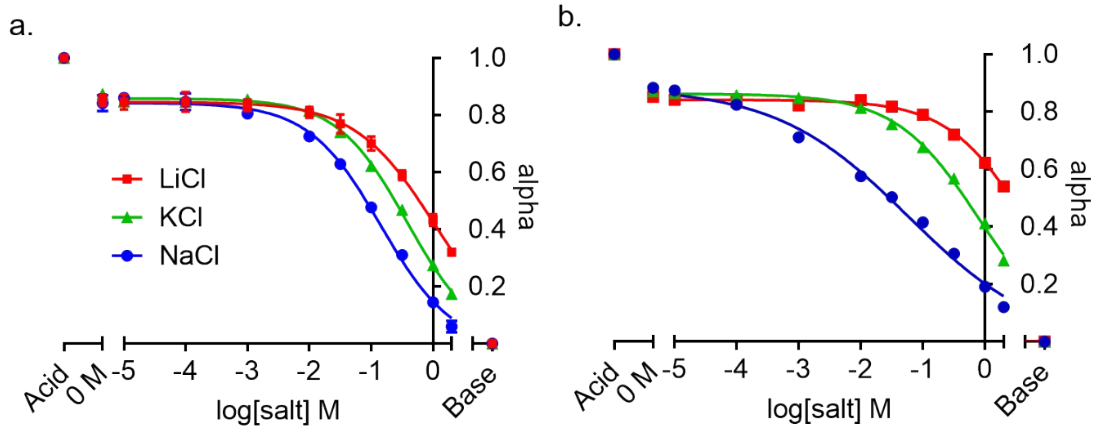

Figure S-2. (a) Normalized fluorescence response of Blueberry-CD nanosensors to either NaCl, KCl, or LiCl. (b) Normalized response of traditional chromoionophore-ionophore Na-nanosensors to NaCl, KCl, or LiCl. The Blueberry-CD nanosensors demonstrate selectivity against K^+ and Li^+ that is in agreement with that of the traditional chromoionophore-based nanosensors.). Error bars represent SD (n = 5) and are not shown if smaller than the symbol height.

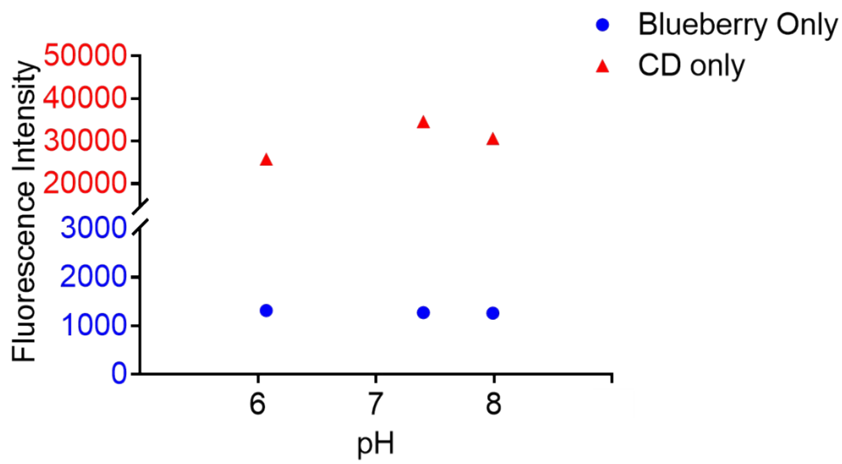

Figure S-3. CD-free nanosensors and the Blueberry dye-free nanosensors showed stable fluorescence at an emission of 480 nm (excitation 420 nm) for the biological pH range of pH 6, pH 7, and pH 8. Error bars represent SD (n=3) and are not shown if smaller than the symbol height.

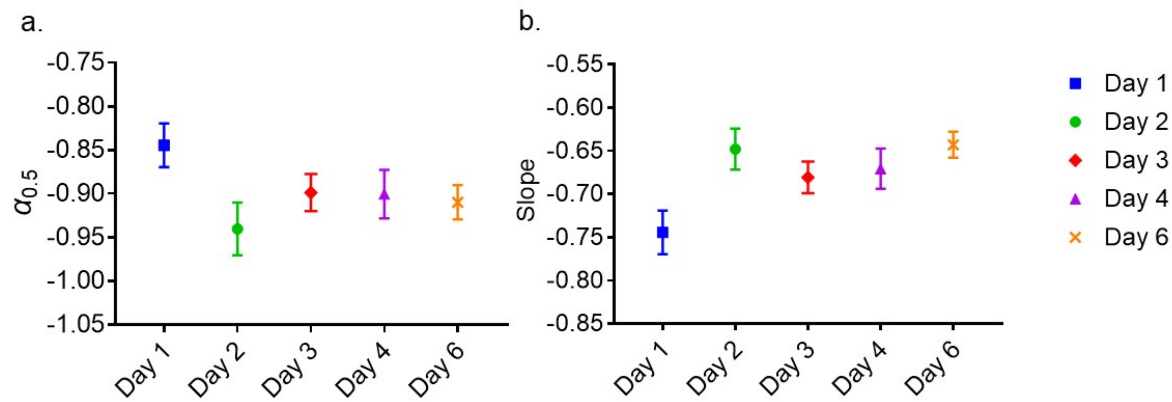

Figure S-4. (a) $\alpha_{0.5}$ for Blueberry-CD nanosensor response to Na^+ over 6-day stability test. The $\alpha_{0.5}$ of day 1 is statistically different than each of the following days, while differences between days 2 through 6 are not significant ($p > 0.05$). (b) Similarly, the log-linear slope of day 1 is statistically different than each of the following days, but the slope remains constant between days 2 through 6 ($p > 0.05$). Error bars represent SD of non-linear fit for each response curve (Figure 6 in text, $n = 5$).

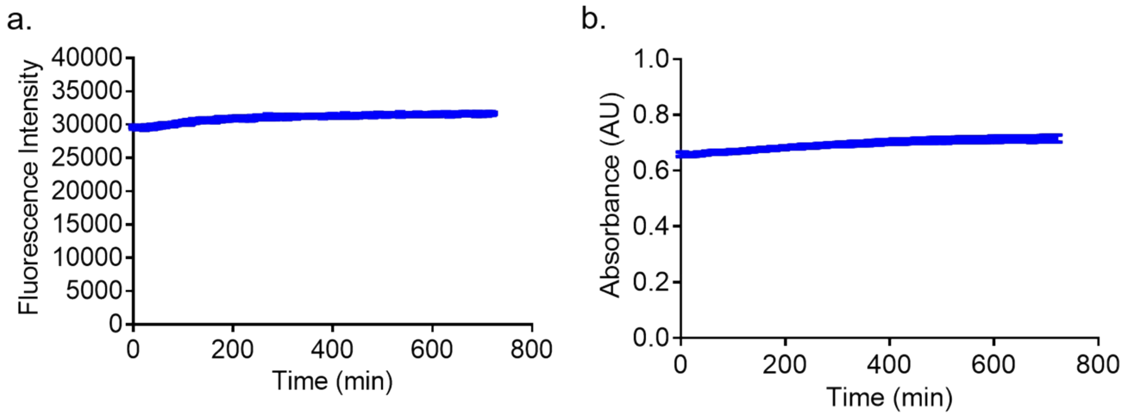

Figure S-5. a) Fluorescence intensity of Blueberry-CD nanosensors and (b) Absorbance of Blueberry-CD nanosensors observed every 30 s for 720 min, demonstrating no detectable changes in optical properties, respectively. Error bars (n = 5) are shown and are represented by the line width.

PALS	*Day 1*		*Day 14*			p-values
ZP	-56.2	± 1.2	-41.2	± 3.6	mV	0.007
Mobility	-4.4	± 0.1	-3.2	± 0.3	$(\mu s^{-1})(V cm^{-1})^{-1}$	0.084

DLS	*Day 1*		*Day 14*			p-values
Eff. Dia.	201	± 3	207	± 1	nm	0.032
Intensity	250	± 19	236	± 18	nm	0.056
Volume	219	± 5	234	± 23	nm	0.035
Number	129	± 41	143	± 67	nm	0.146

Table S-1. Characterization of nanosensors on day 1 and day 14 with dynamic light scattering (DLS) and phase analysis light scattering (PALS). ZP = zeta potential, Eff. Dia. = Effective diameter, intensity = intensity-average diameter, volume = volume-average diameter, number = number-average diameter. Error represents SD (n = 3). P-values are given based on a two-tailed t-test between the average measurement of day 1 and day 14.