Electronic Supplementary Material (ESI) for Sensors & Diagnostics.

Supporting Information for

Optical detection of pH changes in artificial sweat using near-infrared fluorescent nanomaterials

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Supporting information figures S1-S7

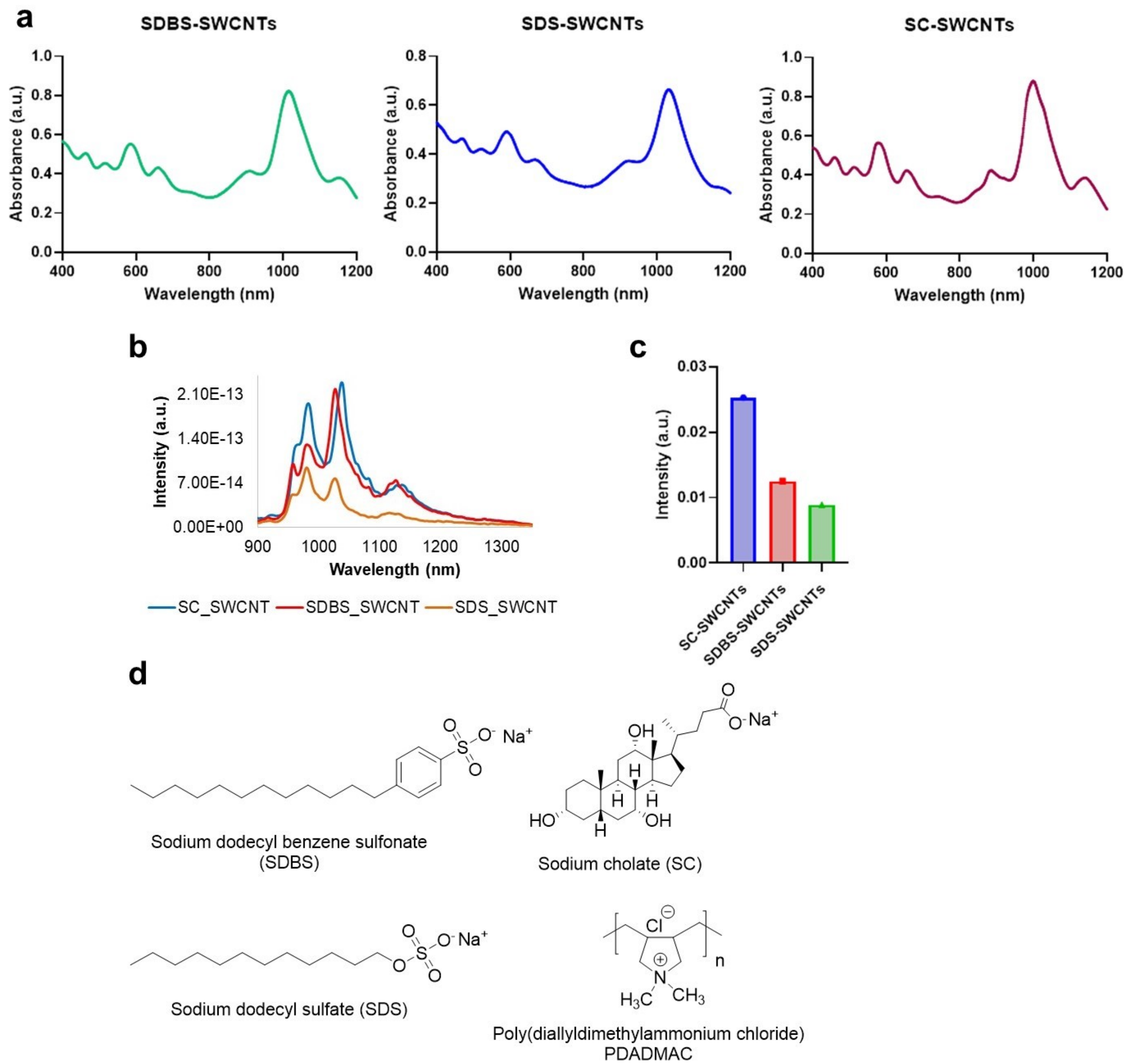

Figure S1. UV-Vis-nIR characterization of nanotubes. a) UV-Vis-near infrared absorption spectra for SC-SWCNTs, SDBS- SWCNTs, and SDS-SWCNTs. b) Emission spectra of SC-SWCNTs, SDBS-SWCNTs, and SDS-SWCNTs. c) Corresponding intensity chart. Concentration of SC-SWCNTs, SDBS-SWCNTs and SDS-SWCNTs were 10 mg/L, 10.83 mg/L and 10.55 mg/L respectively for UV-Vis-nIR measurements and 10 mg/L for all surfactant SWCNTs systems for fluorescence measurements (b-c). Chemical structures of surfactants and the polymer used in this study (d).

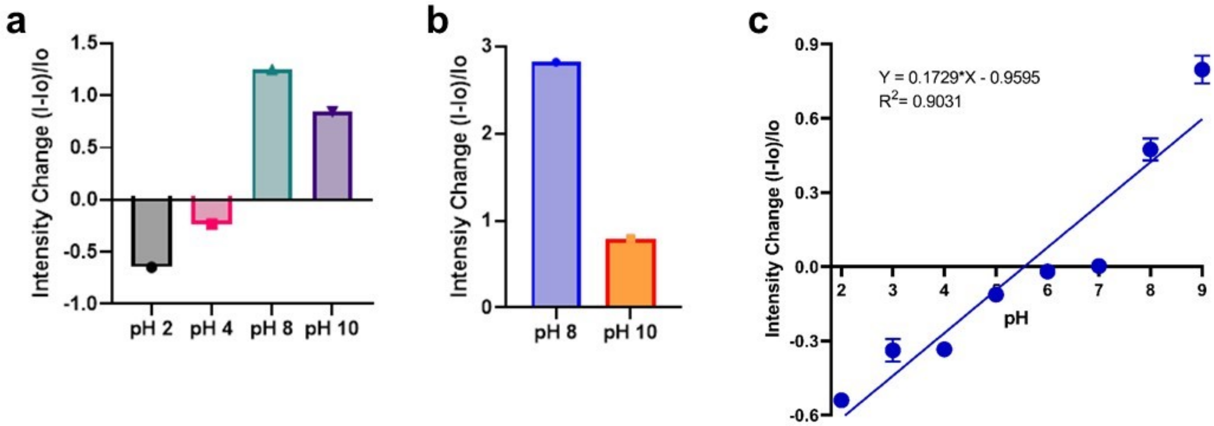

Figure S2. Fluorescence intensity of SWCNT suspension a) SDS-SWCNTs and b) SC-SWCNTs. c) pH-response curve via intensity changes of SDBS-SWCNTs. Solid line represents linear regression fits, *n=3*.

Figure S3. Aggregation of SC-SWCNTs at pH 4.

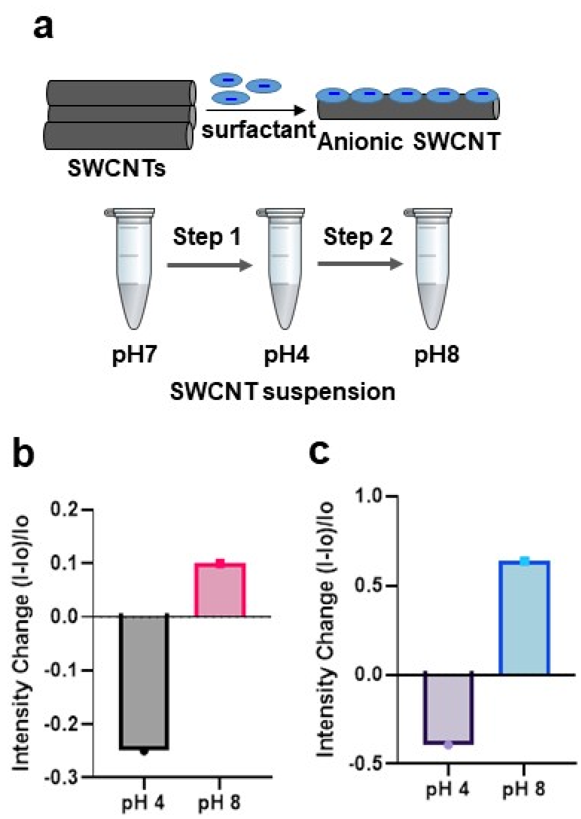

Figure S4. Optical responses from nanotubes for in situ pH ranges a) Schematic illustration of the process, b) Intensity changes of SDS-SWCNTs, c) Intensity changes of SDBS-SWCNTs, *n=3*.

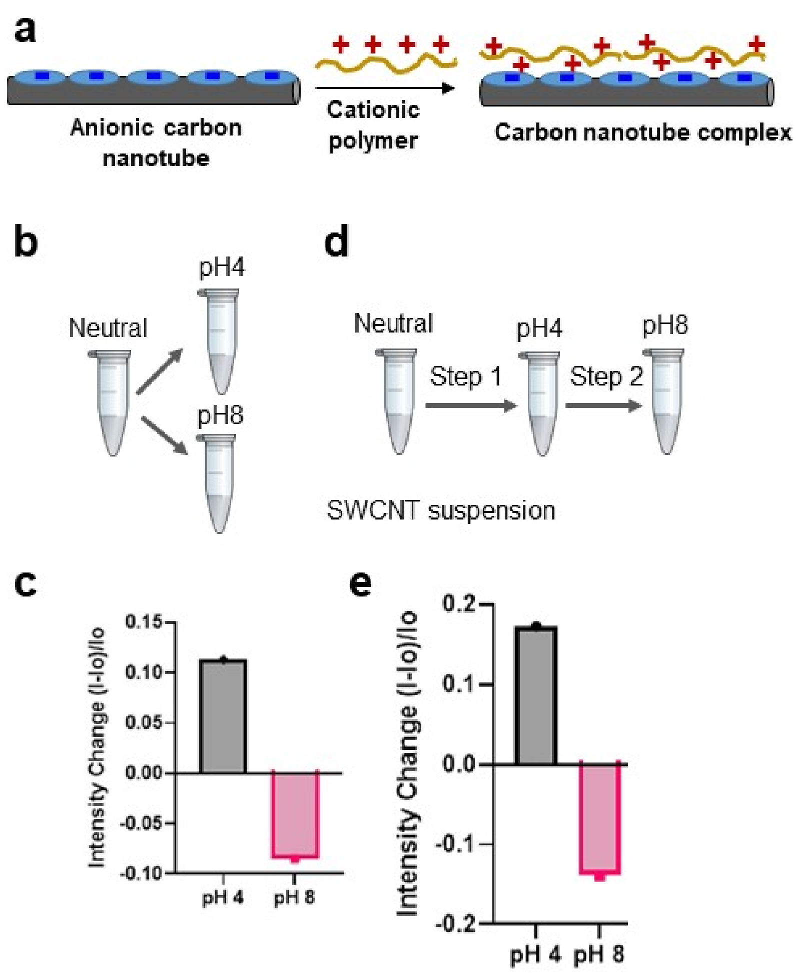

Figure S5. Surface chemistry modulation on nanotubes and optical responses from PDADMAC-SDS-SWCNT at various pH a) Schematic illustration of surface chemistry modulation by adding a cationic polymer, b) Schematic illustration of direct pH changes, c) Intensity changes of PDADMAC-SDS-SWCNTs from direct pH changes represented in b, d) Schematic illustration of in situ pH changes, e) Intensity changes of PDADMAC-SDS-SWCNTs from in situ pH changes represented in d, *n=3*.

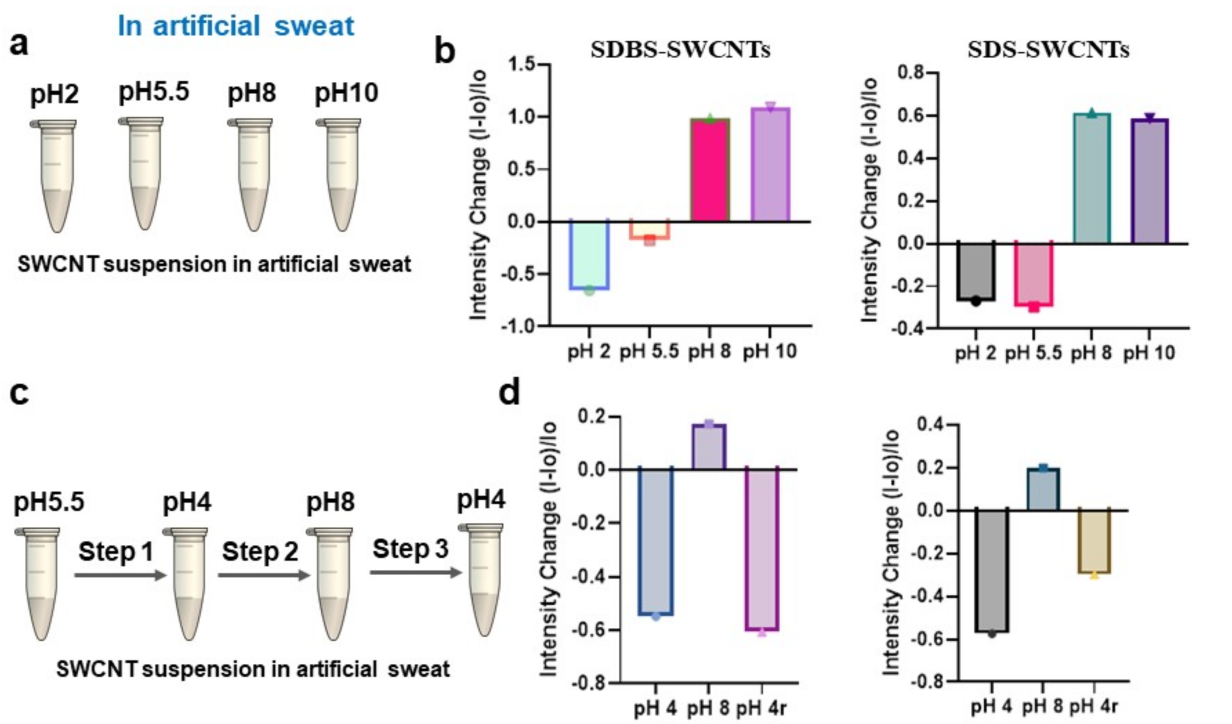

Figure S6. Optical responses in artificial sweat from SDS-SWCNTs at various pH ranges (pH 2-10) a) Schematic illustration of the process, b) Intensity changes at various pH as represented in a, c) Schematic for sequential in situ pH changes, d) Intensity changes in sequential in situ pH changes as represented in c, pH 4r represents solution pH reversed to pH4 from pH 8, *n=3*.

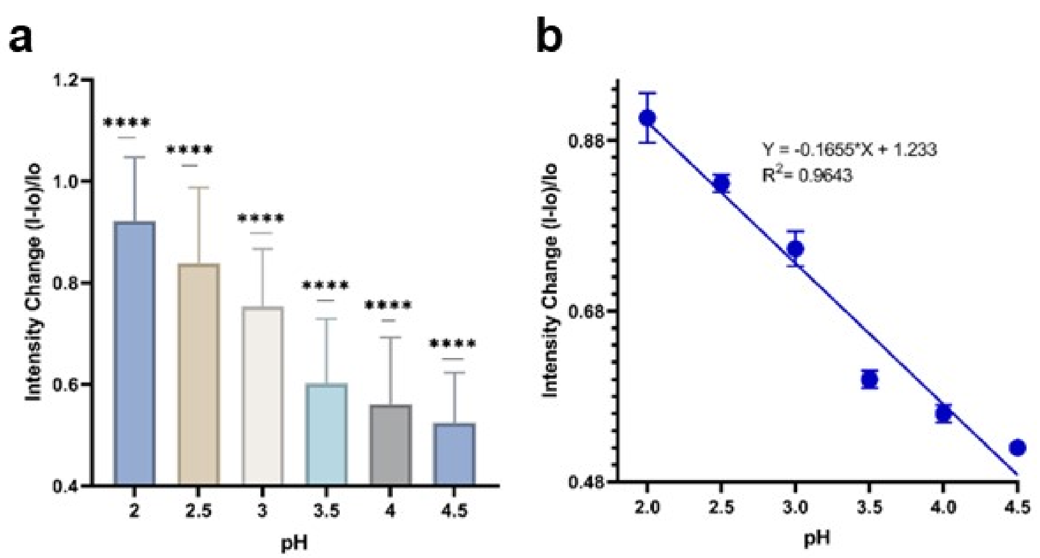

Figure S7. Optical responses from PDADMAC-SDBS-SWCNTs in artificial sweat at various pH ranges (pH 2 - 4.5), $n = 3$ a) Intensity changes and b) pH response curve showing line with fits from linear regression. The two-way ANOVA was run to get the *p* values. The *p* values which are less than 0.001 are summarized with three asterisks (***), and *p* values less than 0.0001 are summarized with four asterisks (****) on the bar graph. Simple regression analysis was run to get the trendline from each triplicating sample mean and average and its corresponding control mean and average.