SUPPORTING INFORMATION

Weaving New Smart Objects: Actuation and Sensing at a Single Electroactive Interface

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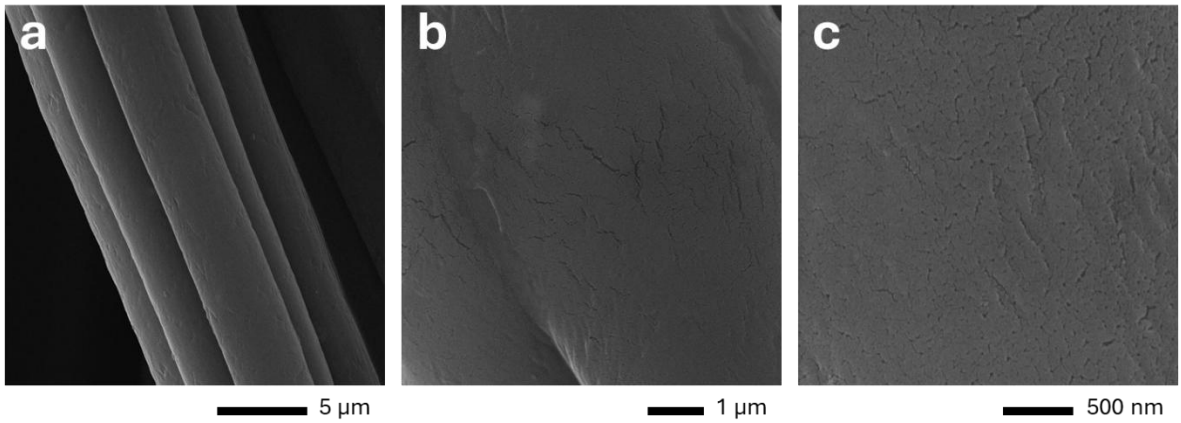

Figure S1. FEG-SEM pictures of a Au-sputtered, screen-printed PEDOT:PSS textile electrode: yarn structure (a) and surface topography (b, c).

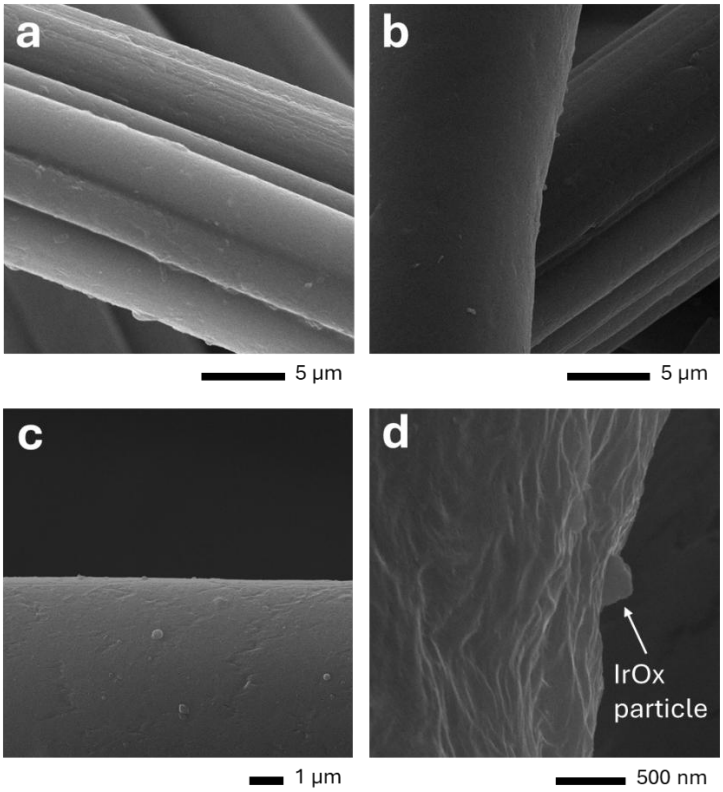

Figure S2. FEG-SEM pictures of a Au-sputtered, screen-printed PEDOT:PSS textile electrode with electrodeposited IrOx Ps: yarn structure (a), surface topography (b, c) and detail of an IrOx particle protruding from the film (d, identified via Energy Dispersive X-Ray Spectroscopy microanalysis).

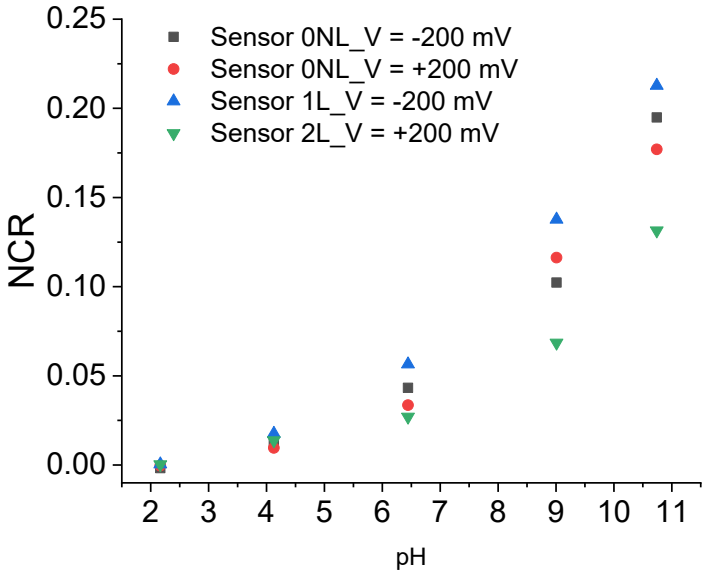

Figure S3. Normalized calibration curves of BTB-loaded (1 L, 2 L) and not loaded (0 NL) sensors.

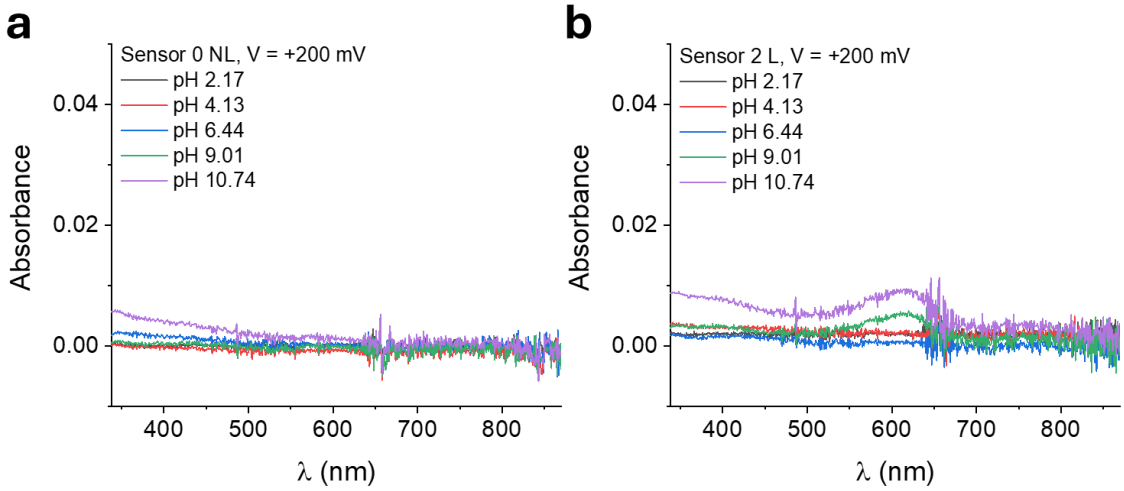

Figure S4. UV-Vis spectra recorded from U.B. aliquots sampled from the electrochemical cell during pH sensing using a not loaded (a) and a loaded (b) sensor at V = +200 mV.

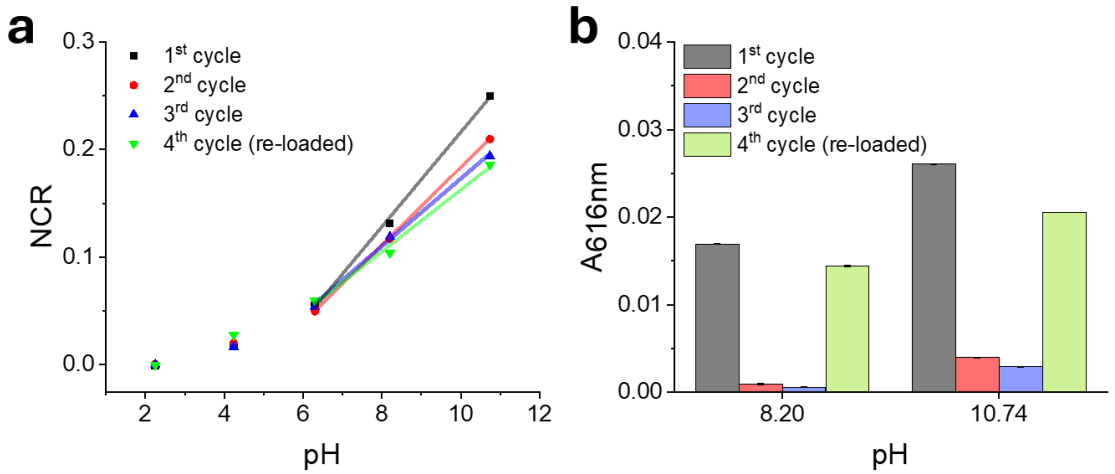

Figure S5. Device stability across multiple sensing-release cycles. Normalized sensitivity (a) and BTB release ability (b, evaluated as the Absorbance at 616 nm) obtained with a textile BTB-loaded device. V = -200 mV. R^2 = 0.998 (1st), 0.999_9 (2nd), 0.998 (3rd) and 0.992 (4th).

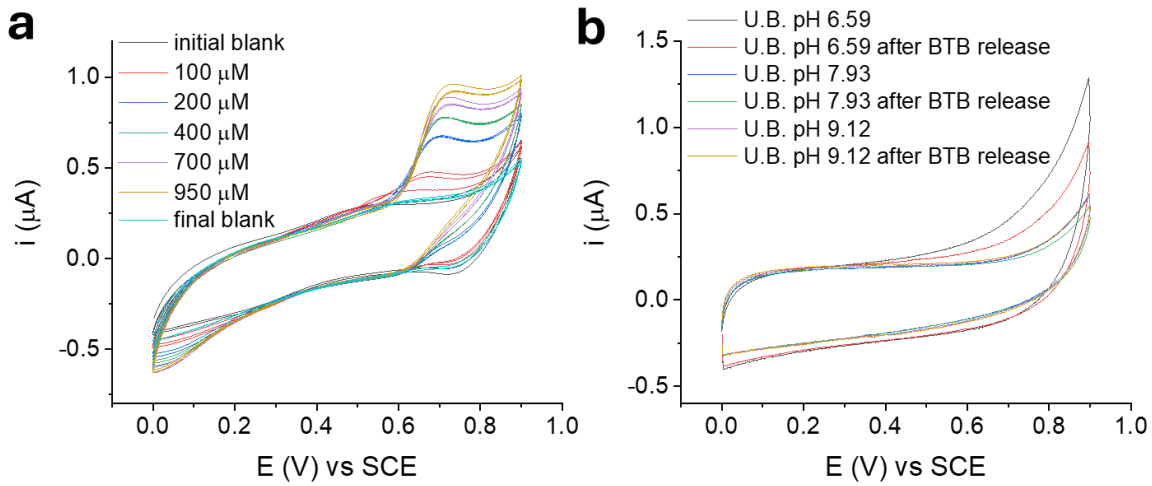

Figure S6. Cyclic voltammograms recorded at a 3 mm diameter glassy carbon electrode (a) in 0.1 M KCl with increasing concentration of BTB and (b) in U.B. solutions where the only possible source of BTB was a loaded textile device. Scan rate 10 mV s^{-1}.

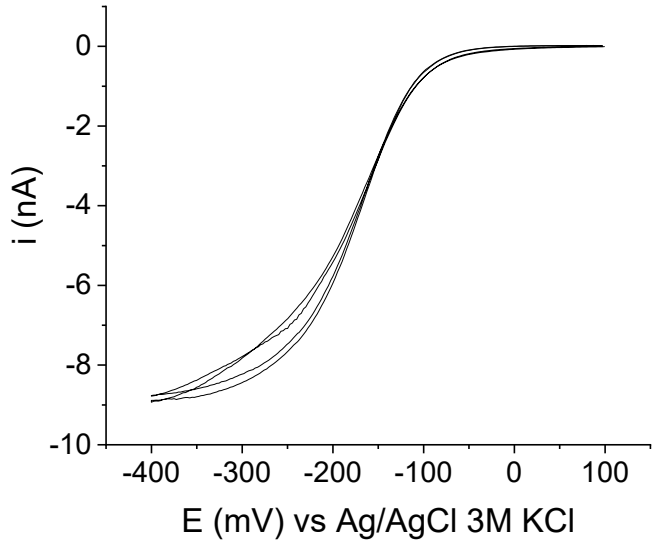

Figure S7. Cyclic voltammograms of a carbon fiber microelectrode in a 5 mM $[Ru(NH_3)_6]Cl_3$ and 0.1 M KCl solution demonstrating the size of the carbon fiber disk electrode. Scan rate 50 mV s^{-1}.

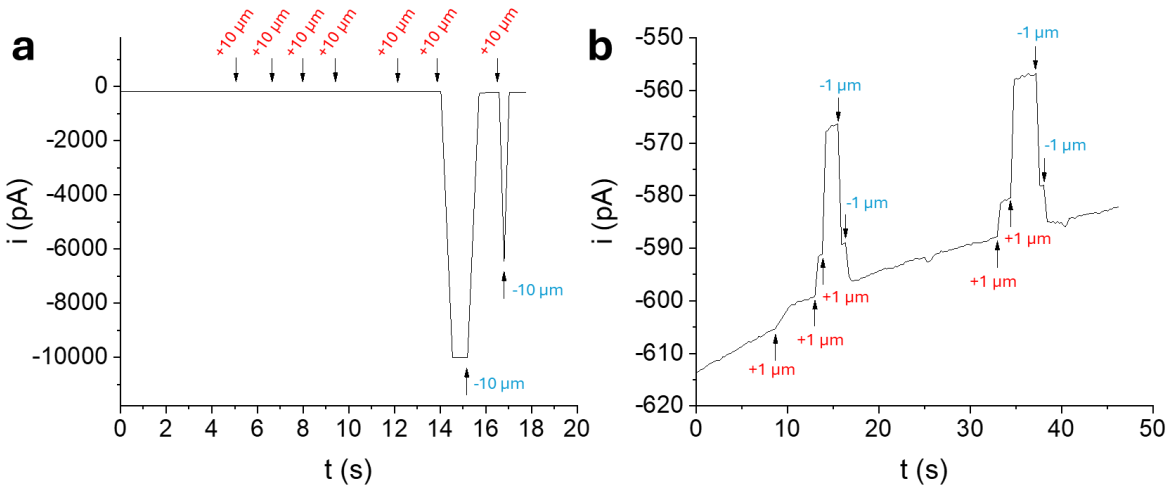

Figure S8. CFME positioning on the loaded textile device in 0.1 M PBS (pH 6.96). (a) Unsuccessful approach leading to current overflow upon contact between the probe and the substrate when a standard 10 µm step approach is used. (b) Two consecutive approaches and retractions from the textile surface were obtained using 1 µm increments in the manual approach. Approach steps are labelled in red (+) and retractions in blue (-).

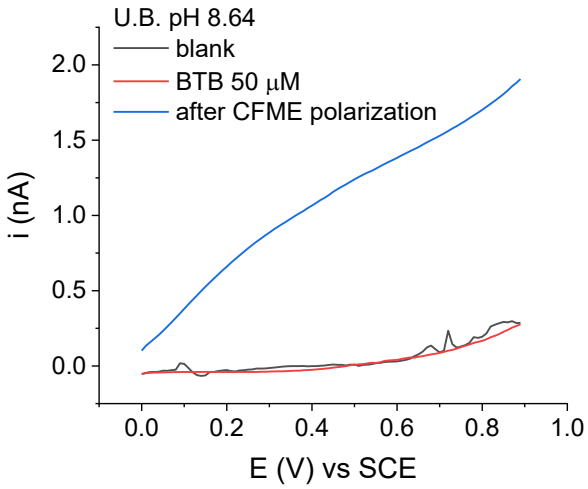

Figure S9. Electrochemical response of a CFME in a U.B. solution (pH 8.64) containing 50 µM BTB before (red curve) and after (blue curve) polarization of the CFME at -600 mV for 600 s. Scan rate 100 mV s^{-1}.

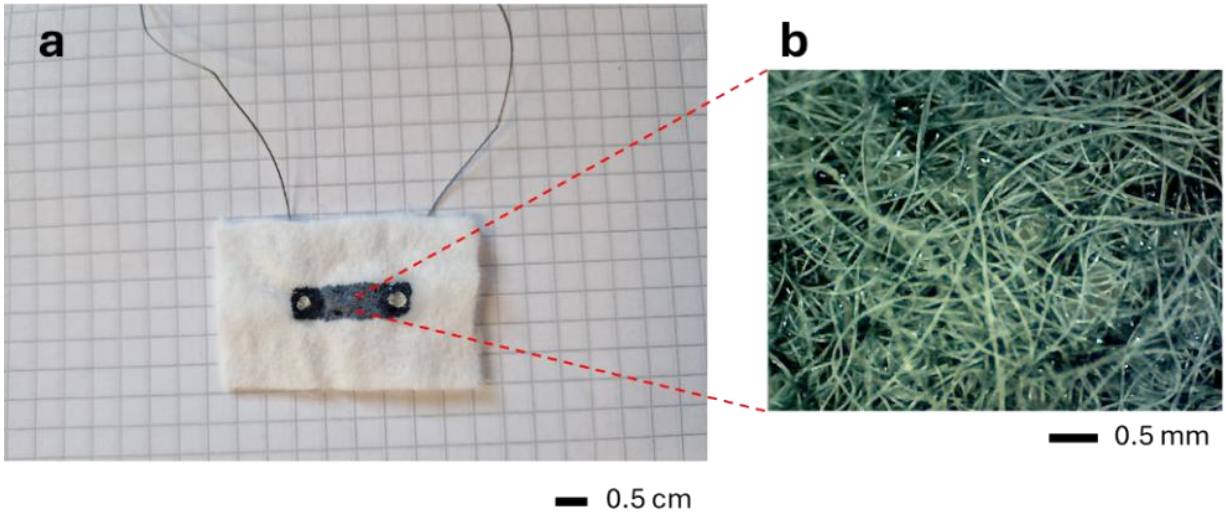

Figure S10. Picture of a fully assembled textile device after functionalization and BTB loading (a) and optical microscope image of the active area showing the non-woven structure of the fabric coated by the semiconductor (b).