Supplementary Information

Liquid crystal elastomers as substrates for 3D, robust, implantable electronics

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Supplementary Figures

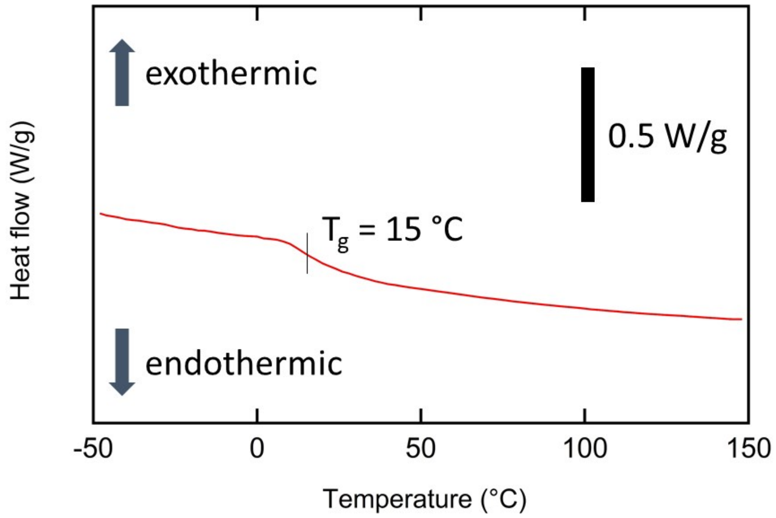

Fig. S1. Representative DSC thermogram of an LCE film during the second heating cycle.

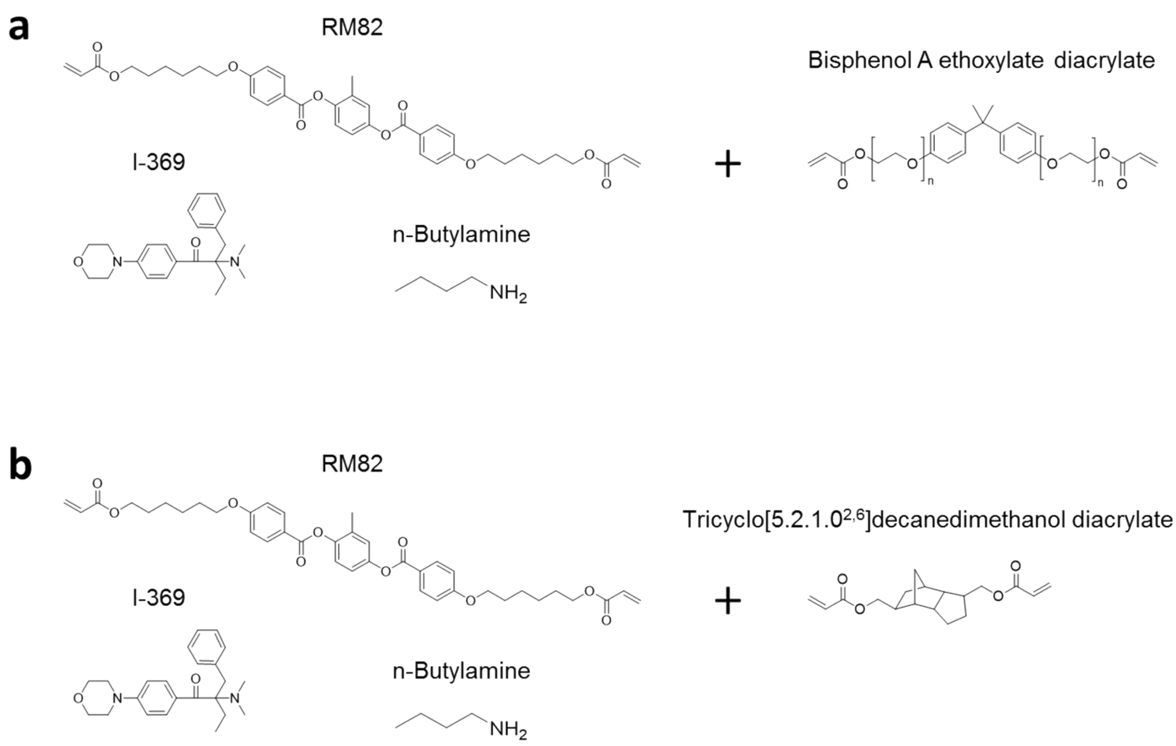

Fig. S2. Monomers used for the synthesis of (a) BPAEDA control and (b) TCMDA control networks.

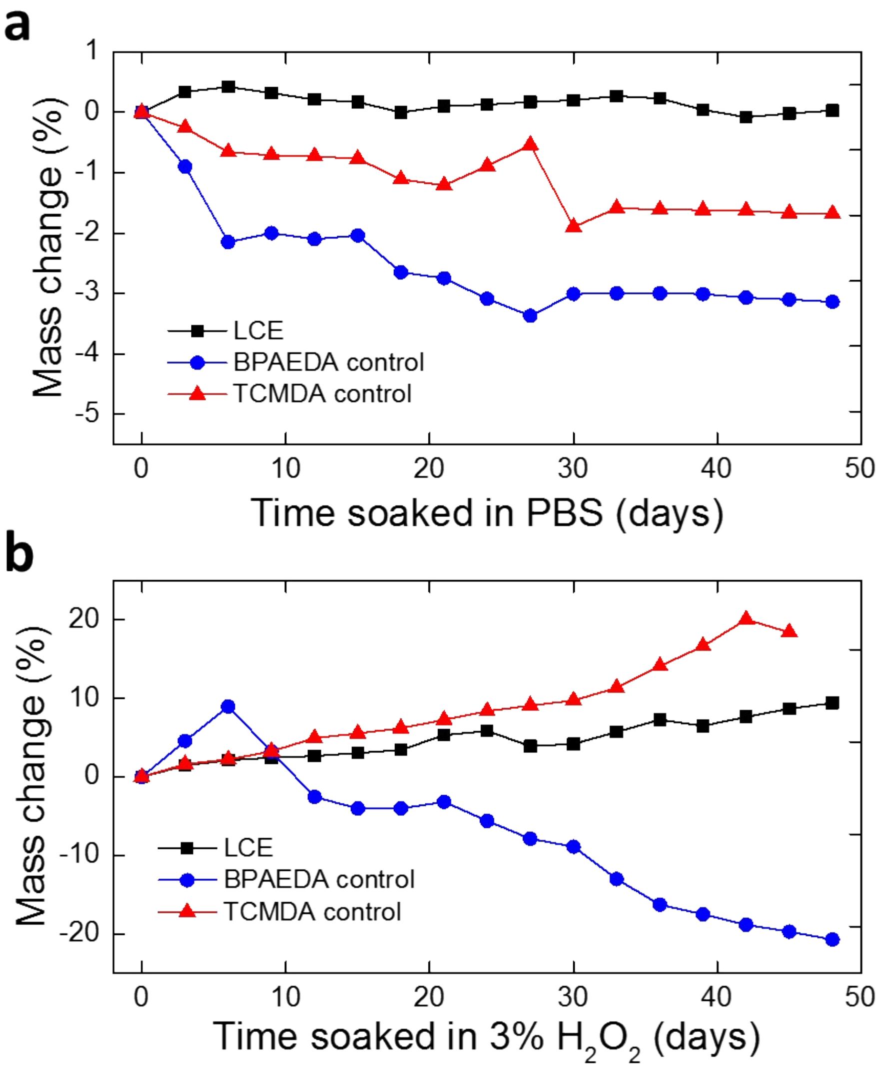

Fig. S3. Real-time monitoring of mass changes in LCE and control films over 48 days in (a) PBS and (b) 3% H_2O_2, both at 37˚C. In (b), Data for TCMDA control on Day 48 is not available due to physical breakdown of the films. Mean values taken from 4 specimens are displayed for all data points without error bars for the clarity of data.

Table S1. Mass loss of LCE and controls in PBS and 3% H_2O_2 after drying on Day 48

	PBS	**3% H_2O_2**
LCE	0.16 ± 0.35%	1.78 ± 0.37%
BPAEDA control	3.68 ± 1.83%	28.88 ± 1.62%
TCMDA control	1.91 ± 0.11%	Lost integrity

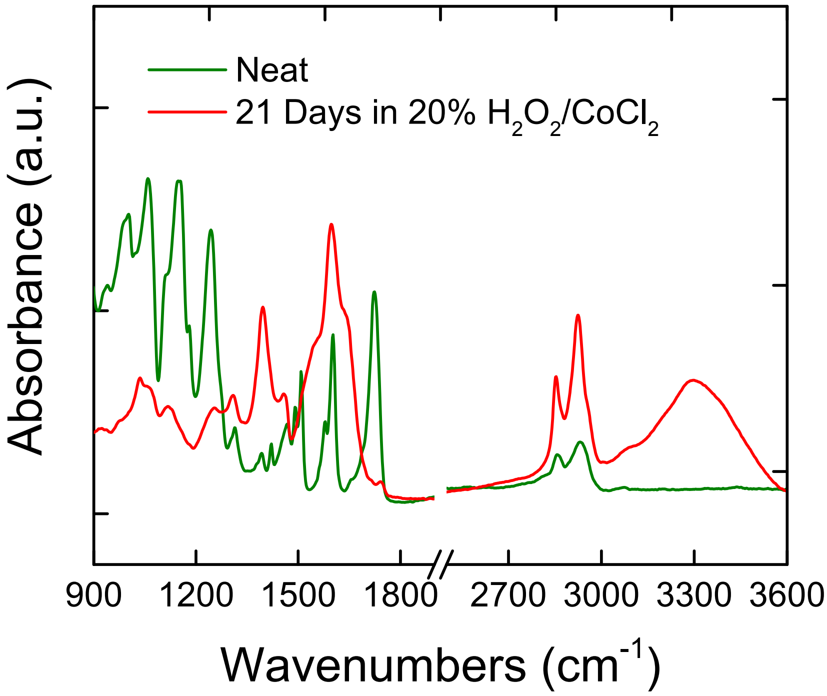

Fig. S4. ATR-FTIR spectra of LCE before oxidation (Neat) and after being soaked in a 20% H_2O_2/0.1 M $CoCl_2$ solution for 21 days.

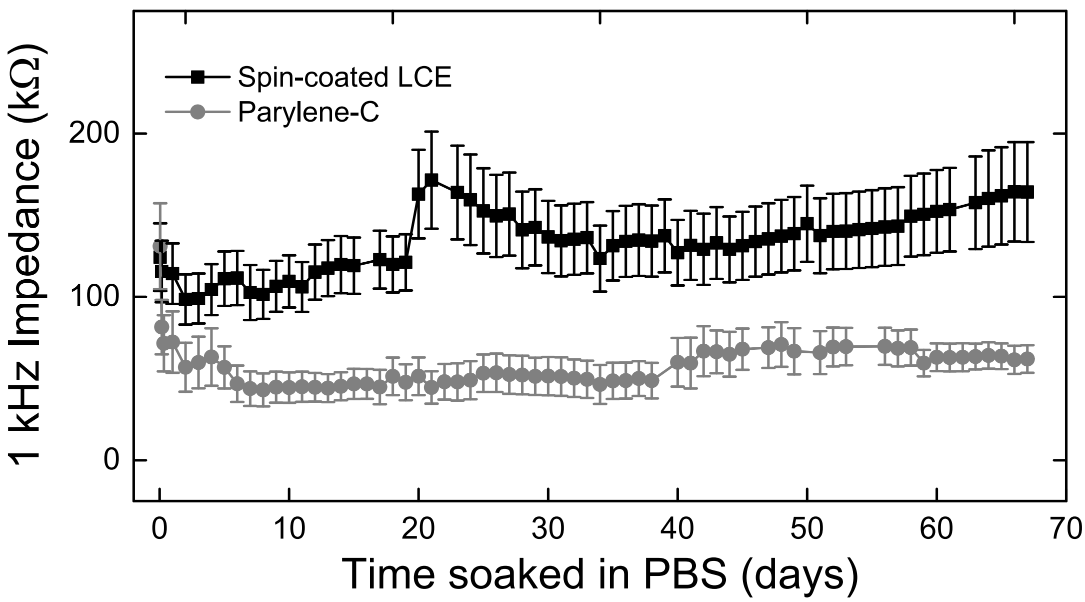

Fig. S5. Monitoring of 1 kHz impedance of 16-channel LCE multielectrode arrays in PBS at 37 ˚C over 67 days. Results for spin-coated LCE (mean ± SEM, n = 15) and Parylene-C encapsulations (mean ± SEM, n = 13) are shown in comparison.

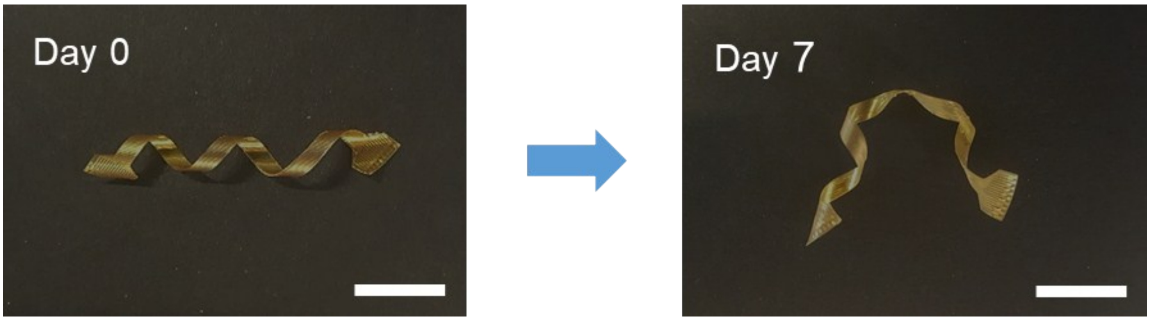

Fig. S6. Shape distortion of LCE after being soaked in a 20% H_2O_2/0.1 M $CoCl_2$ solution for 7 days. (Scale bars = 1 cm).

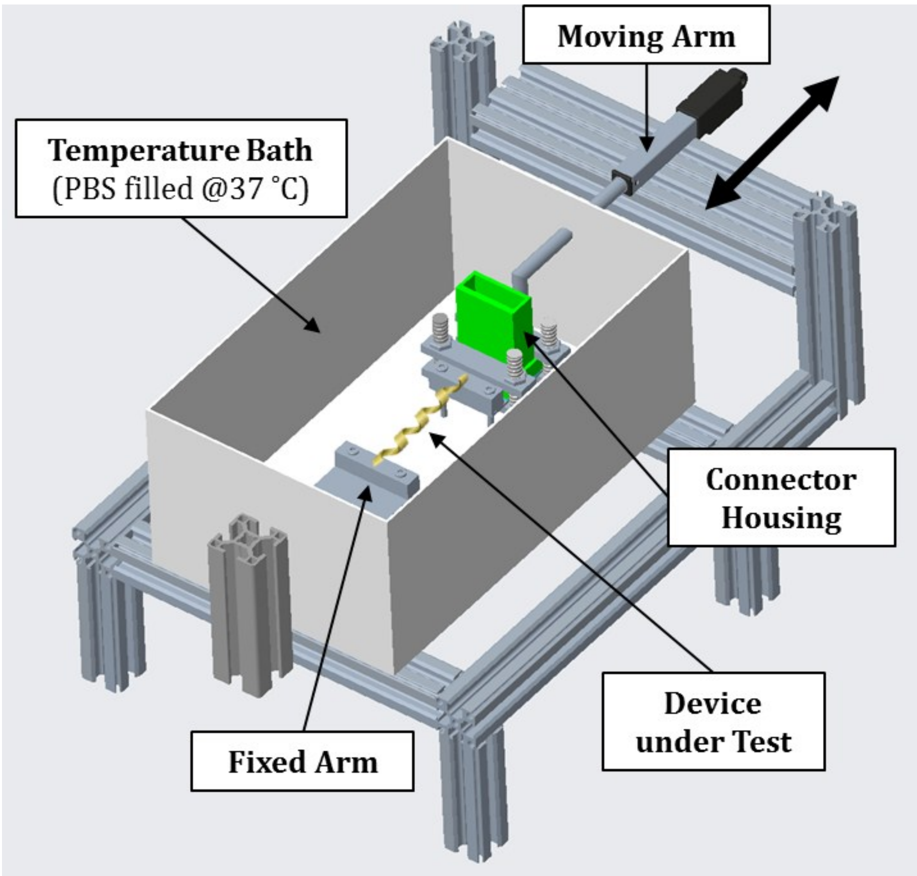

Fig. S7. Schematic drawing of custom-built apparatus for testing LCE cables under cyclic stretching and buckling conditions while being soaked in PBS.

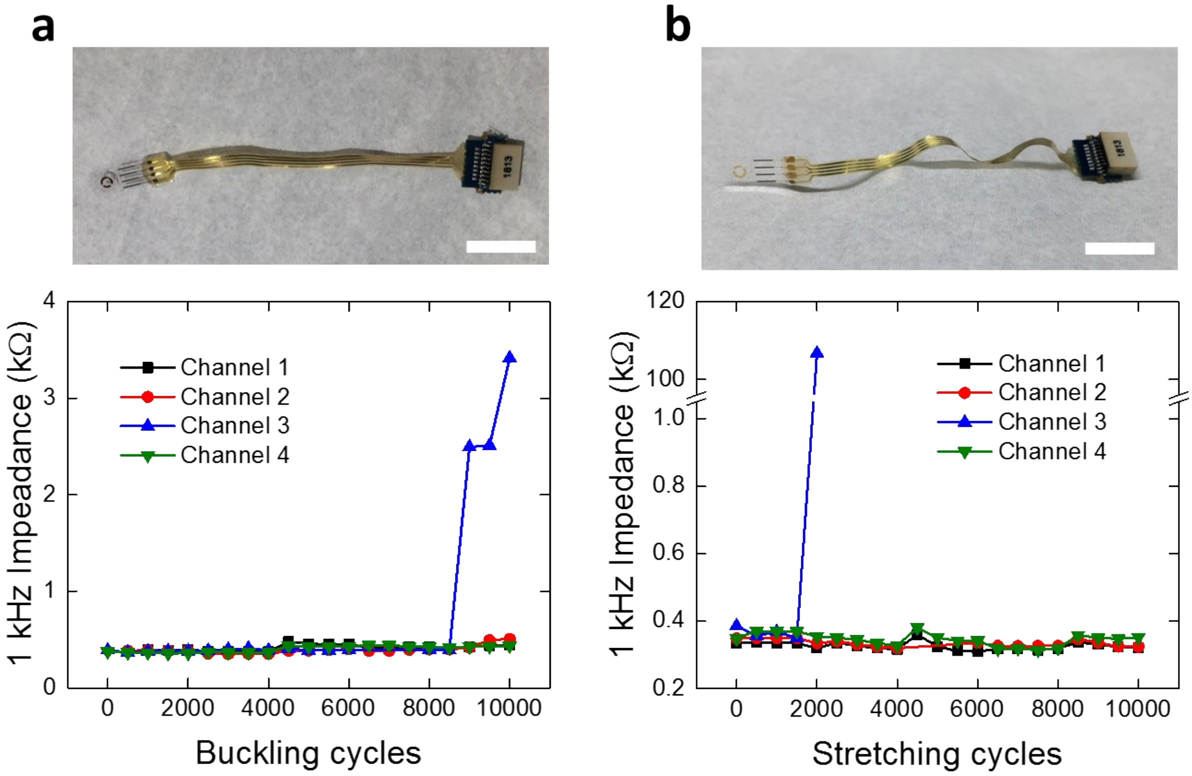

Fig. S8. Monitoring of 1 kHz impedance of (a) flat-cabled cuffs and (b) wavy-cabled cuffs under cyclic buckling (flat) or stretching (twisted) at 60% strain over 10,000 cycles while being soaked in PBS at 37˚C. (Scale bars = 1 cm).