SUPPORTING INFORMATION

Self-Healing Pseudo-Piezoelectric Pressure Sensors from Sustainable Materials

Cephas Amoah,[1] Maria Jose Rojas Herrera,[1] William Stroebel,[1] W. G. Skene[1,3*]

[1] Département de chimie, Université de Montréal, Montreal, QC, Canada
[3] Institut Courtois, Université de Montréal, Montreal, QC, Canada

E-mail: w.skene@umontreal.ca

Table of Contents

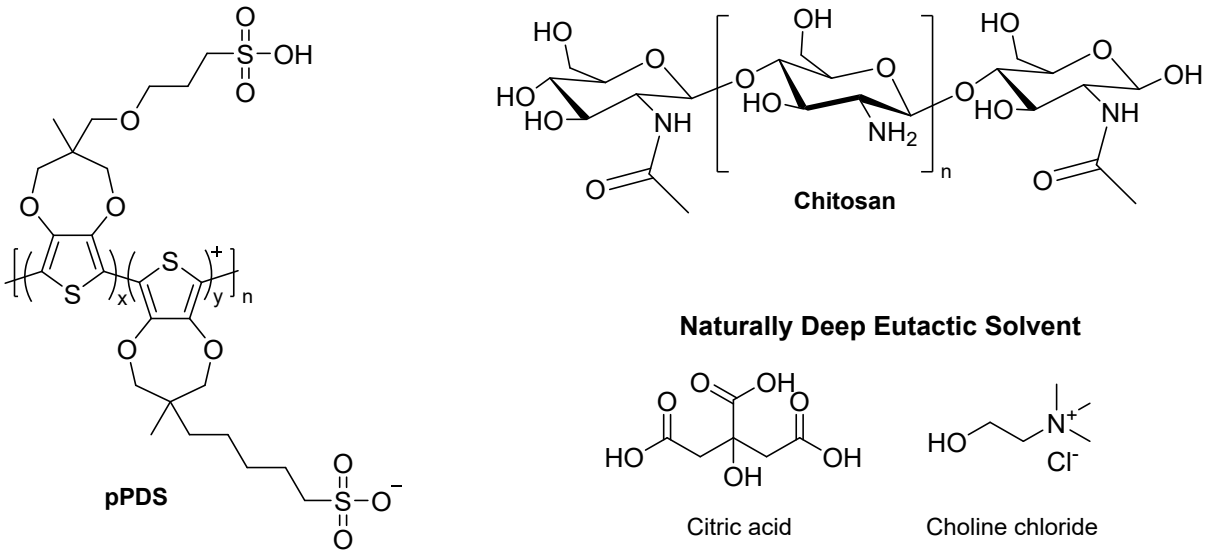

Figure S1. Chemical structures of materials used in elastomers for preparing pseudo-piezoelectric pressure sensors.

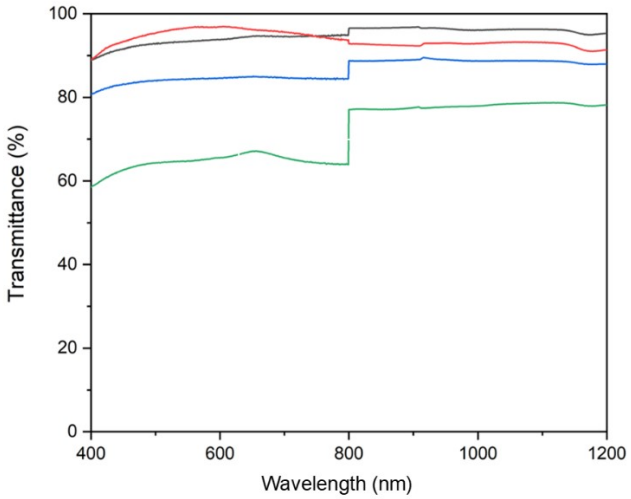

Figure S2. Absorption spectra of films with varying chitosan concentration and deep eutectic solvents: 1.0 wt % (black), 1.5 wt% (red), 2.0 wt% (blue) and 2.5 wt% (green).

Table S1. Young Modulus of **pPDS**-chitosan-NADES films.

pPDS concentration (wt%)	**Elongation at Break (E_b) (± 0.1%)**	**Young's Modulus (MPa) (± 1.2%)**
0.0	68.3	2.68
0.025	72.3	3.09
0.05	69.5	3.17
0.10	76.6	2.25
0.15	66.7	4.28
0.20	80.2	1.97

Table S2. Sheet resistance of **pPDS**-chitosan-NADES films.

Sample (wt% of pPDS)	**Thickness (µm) ± 0.9%**	**Transverse Resistance (MΩ) ± 1.2%**
0.0	202	15.38 [a]
0.025	253	0.83
0.05	244	0.47
0.10	211	0.27
0.15	294	0.14
0.20	297	0.07

[a] Intrinsic ionic conductivity of the 0.0 wt% film.

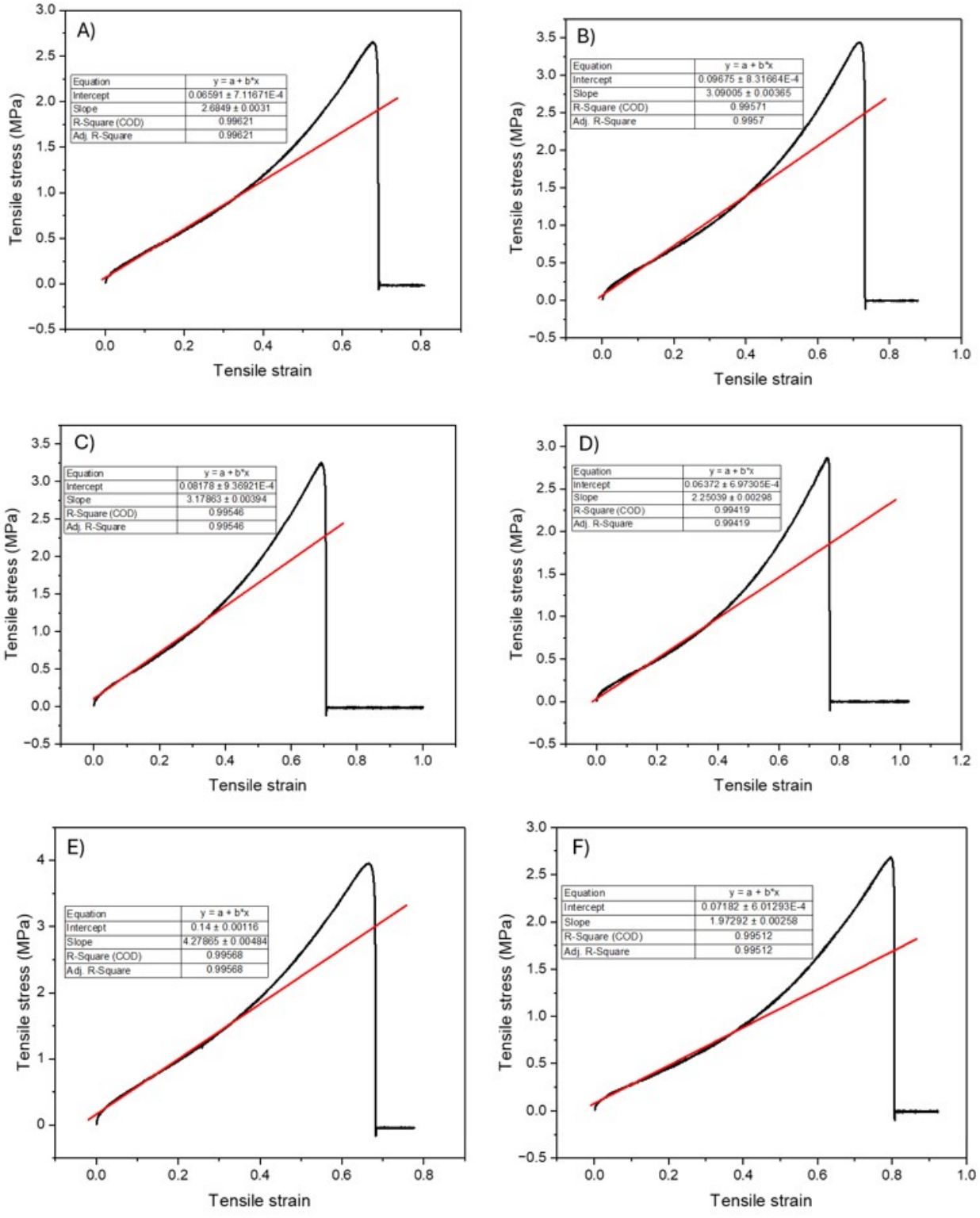

Figure S3. Stress-strain curves (black) of chitosan-NADES films with 0 (A), 0.025 (B), 0.05 (C), 0.10 (D), 0.15 (E), and 0.20 wt % (F) of the conducting polymer, **pPDS**, and Young's modulus fitting of the films (red).

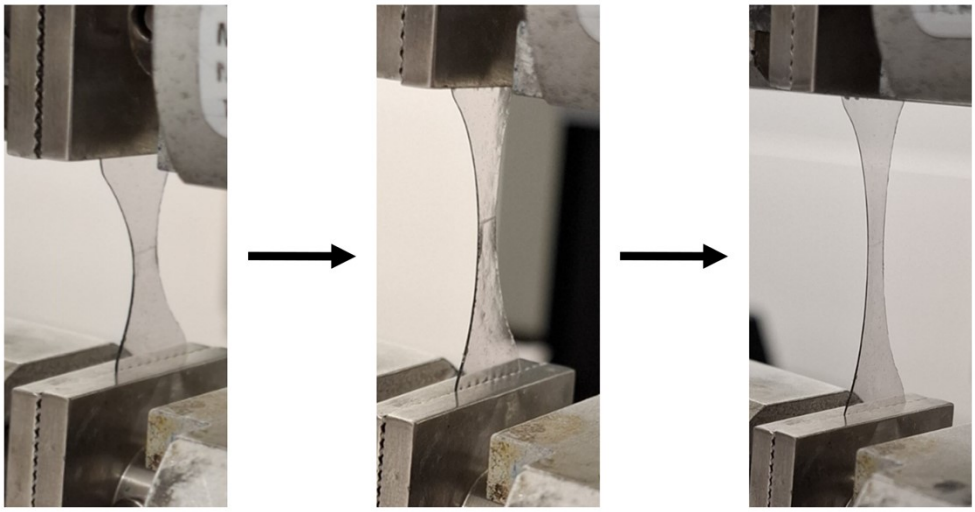

Figure S4. Photographs of self-healed 0.20 wt% **pPDS**-chitosan-NADES film stretched from resting position (left) to 100% elongation (right).

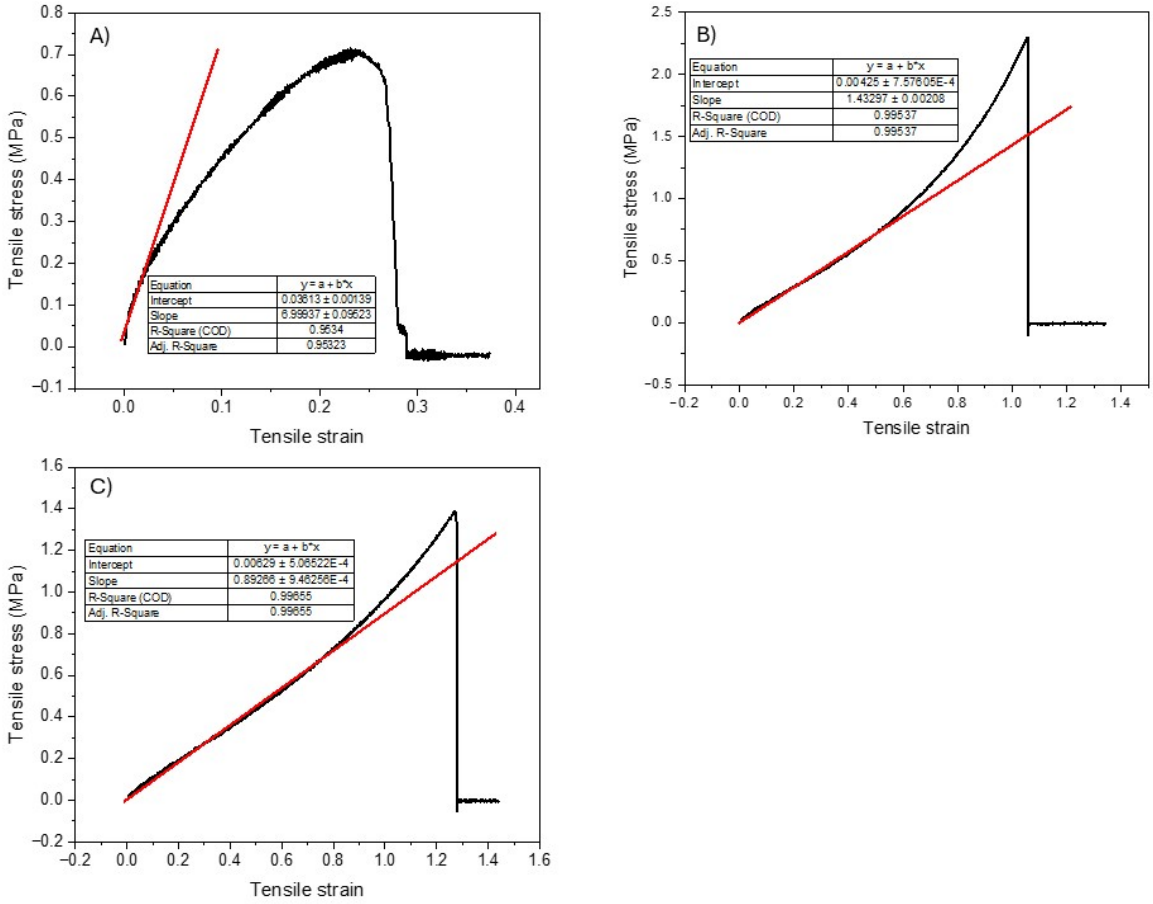

Figure S5. Stress-strain curves of self-healed 0.20 wt% **pPDS**-chitosan-NADES films after self-healing times of 5 (A), 30 (B), and 60 mins (C) along with the Young's modulus fitting (red).

Table S3. Young's modulus of self-healed **pPDS**-chitosan-NADES films at different healing time.[1]

Time (h)	**Elongation at Break (E_b) (± 0.1%)**	**Young's Modulus (MPa) (± 1.7%)**	**σ_{max}**	**Relative toughness**	**Change in toughness**	**Healing amount (%)[2]**
0	81%	5.46	100%	100%	0	100
5	51%	7.00	21%	14%	-86%	63
30	90%	1.43	56%	75%	-25%	112
60	158%	0.89	27%	59%	-42%	195%

[1] 0.20 wt% of **pPDS** blended in compounded mixture. [2] Calculated by $\frac{\varepsilon_{break(t)}}{\varepsilon_{break}(t=0)} \cdot 100$

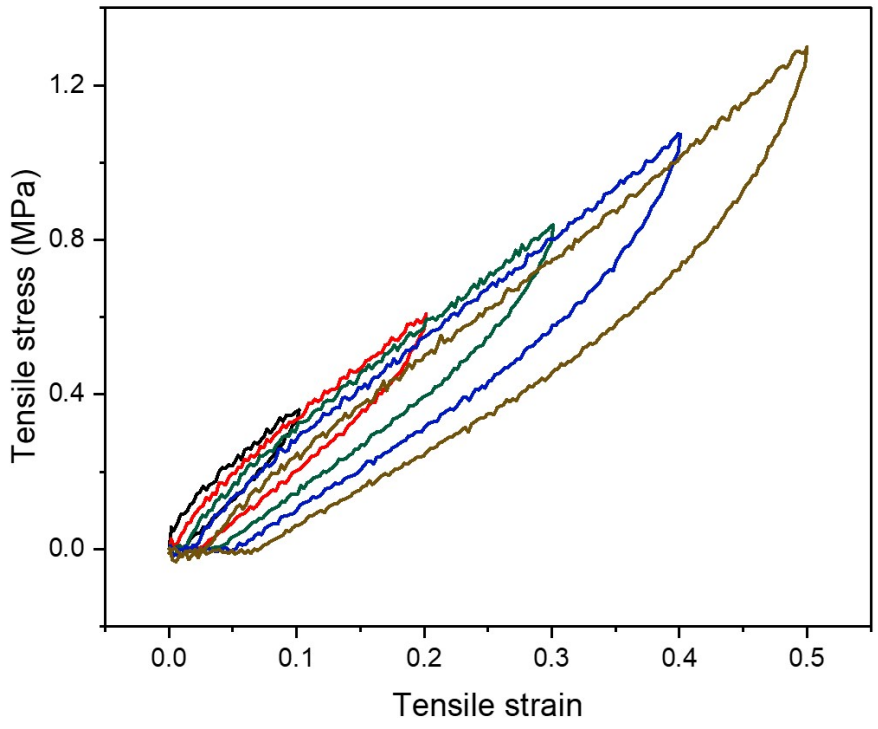

Figure S6. Hysteresis measurement of 0.20 wt% **pPDS**-chitosan-NADES film at 10 (black), 20 (red), 30 (green), 40 (blue) and 50% (gold) elongation.