SUPPORTING INFORMATION

Direct Ink Writing of PEDOT Eutectogels as Substrate-free Dry Electrodes for

Electromyography

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Figure S1. A) FTIR analysis of all PEDOT:PSS/DES supramolecular eutectogels and B) FTIR window amplification that shows signals attributed to the stretching vibrations of the sulfonic groups (-SO₃H) in PSS, compared with all the PEDOT:PSS/DES



Figure S2. A) Storage (G') and loss modulus (G'') of 50:50 wt% PEDOT:PSS/DES as a function of strain. B) Viscosity of initial all PEDOT:PSS/DES supramolecular gels measured in shear-thinning studies



Figure S3. Nyquist plot of three structurally different eutectogels *i.e.* PEDOT:PSS/ChCl:PDO, PEDOT:PSS/ChCl:PTSA, and PEDOT:PSS/ChCl:LAC. Nyquist plot compared the material's behavior at wet-state (25 °C) and dry-state (75 °C)



Figure S4. A) Cyclic voltammograms (CVs) of PEDOT:PSS/ChCl:LAC at different scan rates in 0.1 M NaCl aqueous solution and B) Current intensity of oxidation (0.40V) and reduction (0.25V) peaks at different scan rates



Figure S5. 3D printed shapes of PEDOT:PSS/ChCI:LAC with hexagonal and stripped patterns before and after annealing at 50°C during 16h. The dried material showed self-standing, flexibility, and stability characteristics

	Contact Area (cm ²)		
S	Hexagonal	Striped	Solid
1	2.49	1.97	4.089
2	2.23	2.35	3.882
Photo			
lmageJ Analysis			

Figure S6. Area calculation of the hexagonal, square, and solid patterns using *ImageJ* analysis of frontal images



Figure S7. Scheme of the assembled *Eutecta2* with the soft-cable connector on top of the double-side adhesive/transfer paper



Figure S8. Impedance spectra of PEDOT:PSS/ChCI:LAC with different geometrical electrodes, also compared to the commercial Ag/AgCI electrode. Frequencies at 50Hz were used to compare *vs.* contact area



Figura S9. SEM image of the tattoo pre- (left) and after-used (right). Yellow arrows indicate the formation of wrinkles that indicate the conformation of the material on the skin (scale bar = 200μ m)



Figure S10. A) Eutecta2 appearance 14 days after its use. The high integrity after removal of the skin demonstrates its physical reusability, B) EMG recording of bio-potentials in the forearm position, and C) Signal-to-noise ratio between the *Eutecta2* measured day 1 and day 14