SUPPORTING INFORMATION

Electroactive 3D printable poly(3,4-ethylenedioxythiophene)-*graft*-poly(ε-caprolactone) copolymers as scaffolds for muscle cell alignment

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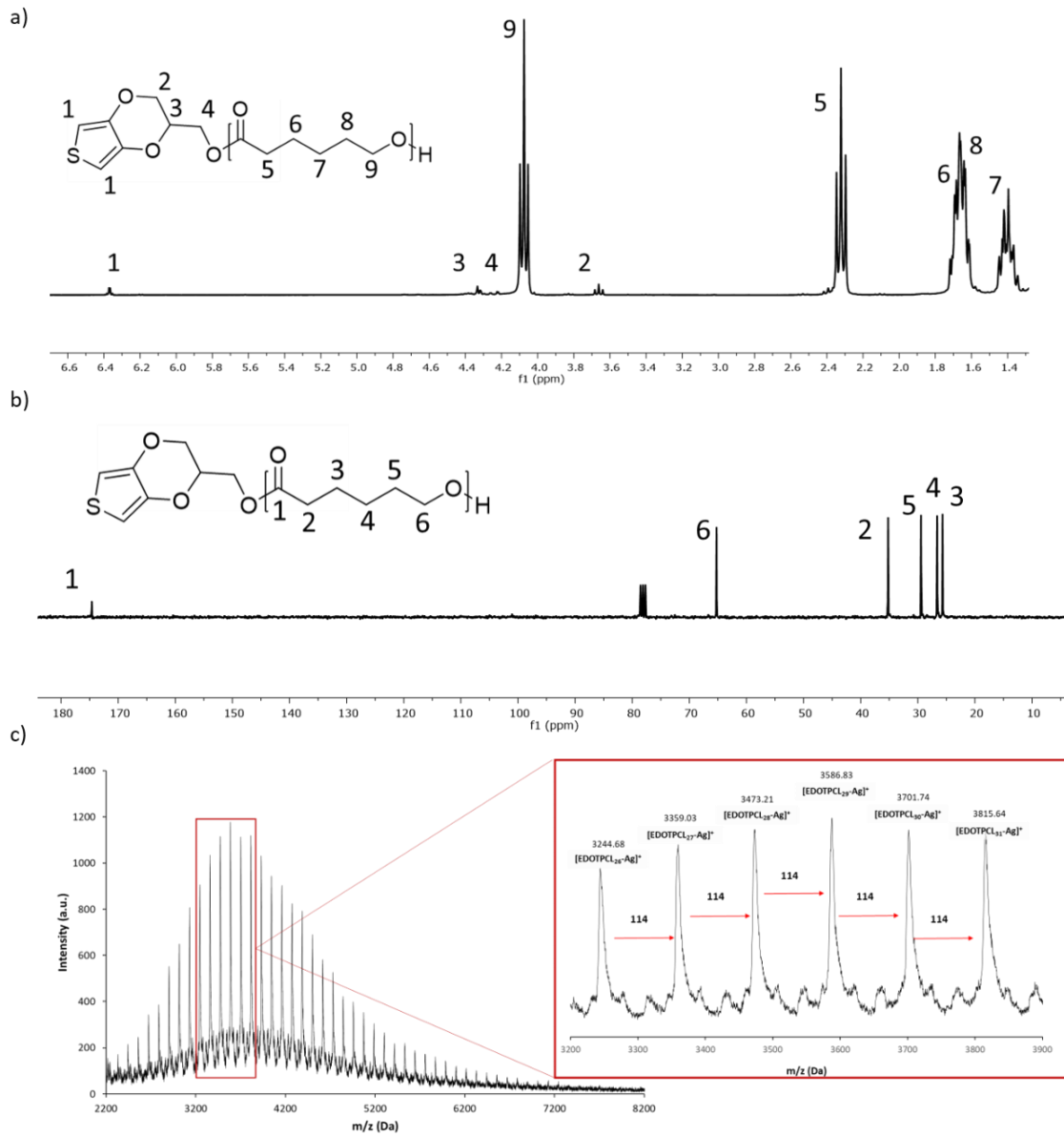[e] Ikerbasque, Basque Foundation for Science, 48013 Bilbao, Spain.

Figure S1. a) ^{1}H-NMR and b) ^{13}C-NMR spectra of EDOT-PCL$_{4k}$ macromonomers obtained by bulk ring-opening polymerization of ε-caprolactone using hydroxyl methyl EDOT as initiator and a mixture of MSA:DMAP as organocatalysts. c) MALDI-TOF of the PCL$_{4k}$ indicating a monomodal mass profile distribution.

Table S1. Molecular weight, determined by SEC and ^{1}H-NMR, and polydispersity of the EDOT-PCL macromonomers synthesized. Synthetic conditions carried out in bulk at 130°C for 5 days and using MSA:DMAP as organocatalyst.

Macromonomer	M_n (g mol^{-1})[a]	M_n (g mol^{-1})[b]	M_n (g mol^{-1})[c]	PDI[d]
PCL$_{16k}$	16 000	15 400	15 221	1.56
PCL$_{8k}$	7 500	8 200	8 941	1.93
PCL$_{4k}$	4 000	3 600	4 414	1.46

[a] Theoretical number-average molecular weight
[b] Experimental number-average molecular weight calculated with ^{1}H-NMR
[c] Experimental number-average molecular weight calculated with SEC using PS standards
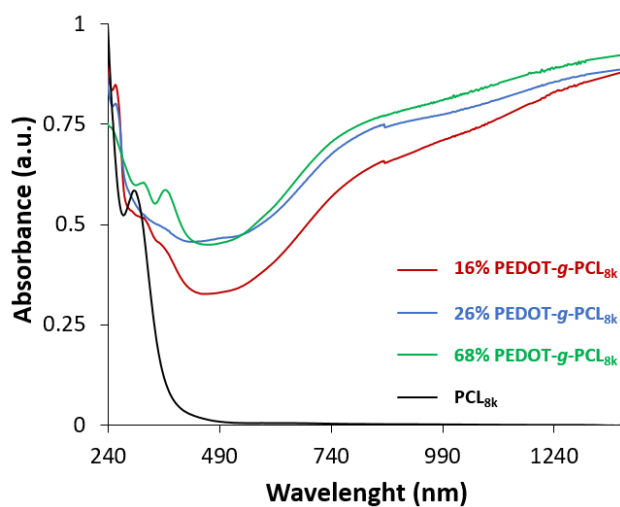[d] Dispersity = M_w /M_n calculated by SEC

Figure S2. UV-vis spectra of PCL macromonomer and the copolymers PEDOT-*g*-PCL$_{8k}$ synthesized with different PEDOT compositions 16, 26 and 68 %wt.
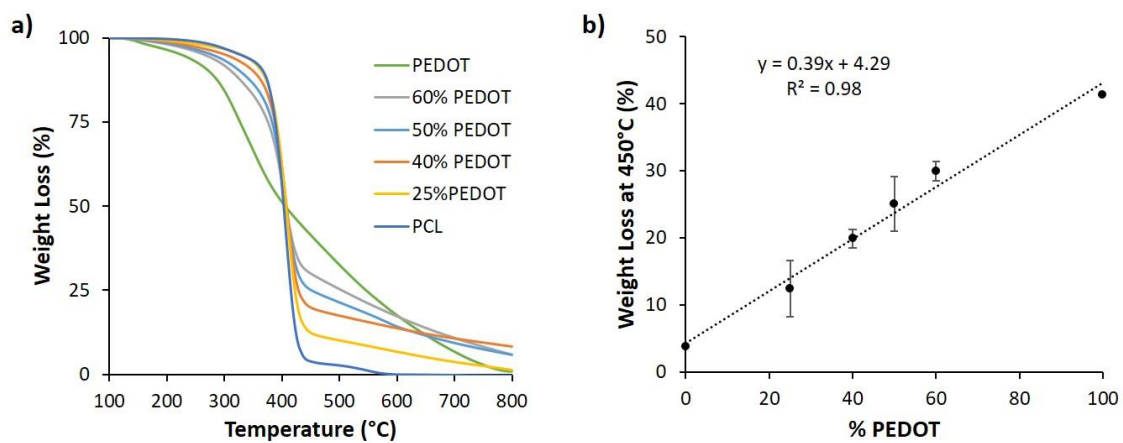
Figure S3. a) TGA spectra of both polymers, PEDOT and PCL, and blends with different PEDOT percentages 25, 40, 50 and 60%, to obtain b) the calibration curve employed to determine the PEDOT percentage in the synthesized PEDOT-*g*-PCL copolymers. The dashed line shows the linear fitting expressed as: $weight\ loss\ (\%) = 0.39 + 4.29 \cdot PEDOT\ (\%)$
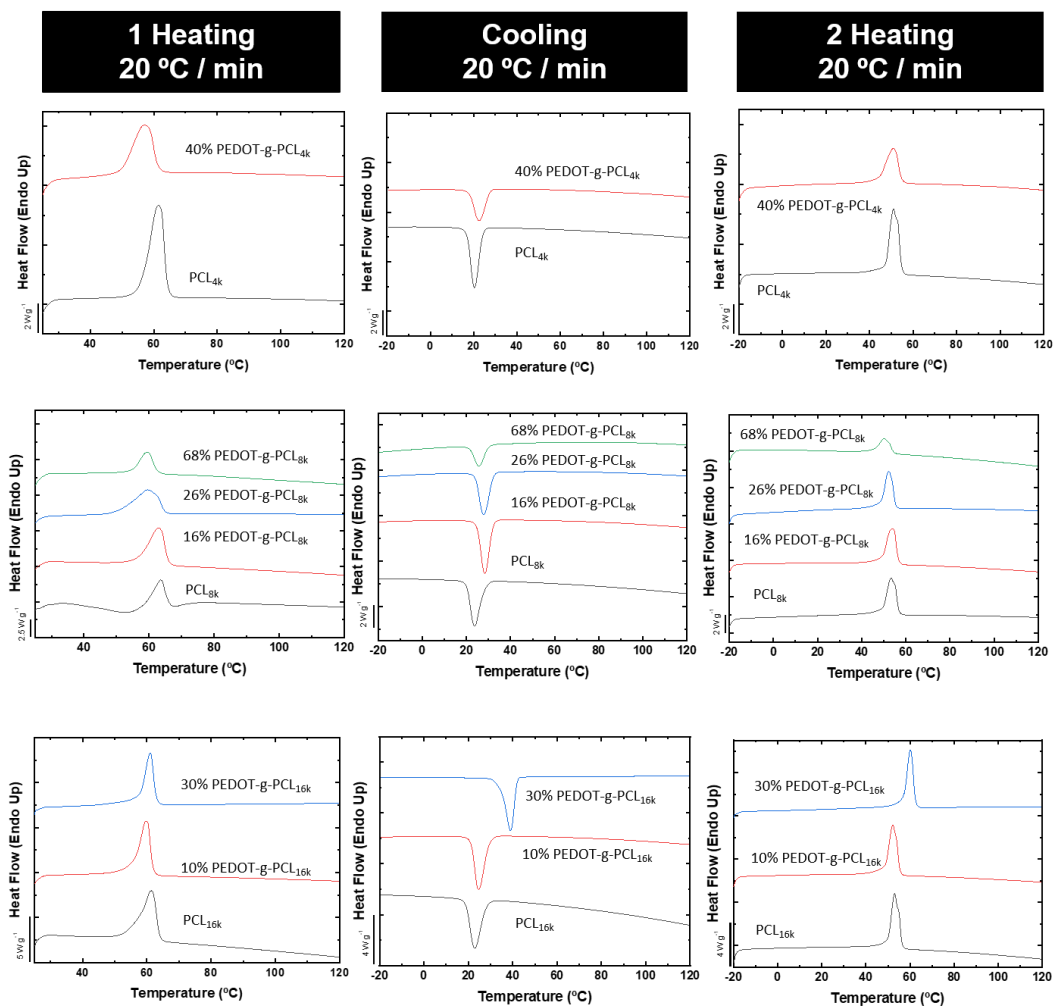
Figure S4. DSC of the PCL macromonomers synthesized with different number average molecular weights (M_n = 4k, 8k and 16k) and their corresponding graft copolymers a) PEDOT-*g*-PCL$_{4k}$, b) PEDOT-*g*-PCL$_{8k}$ and c) PEDOT-*g*-PCL$_{16k}$.
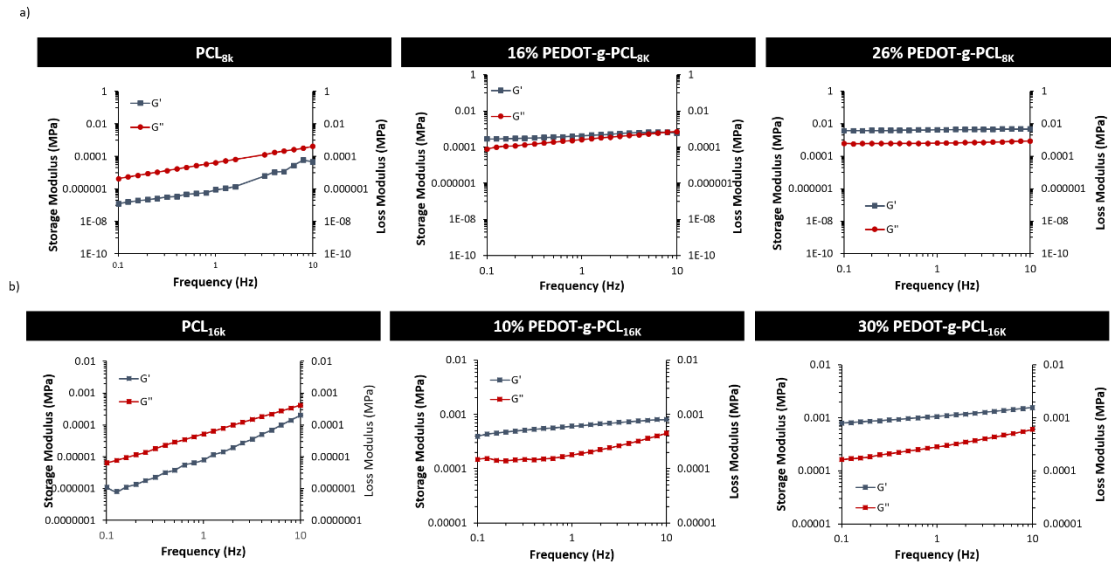
Figure S5. Storage modulus (G') and loss modulus (G'') at 65 °C of PCL macromonomers synthesized with different number average molecular weights (M_n = 8k and 16k) and their corresponding graft copolymers a) PEDOT-*g*-PCL$_{8k}$, and b) PEDOT-*g*-PCL$_{16k}$.
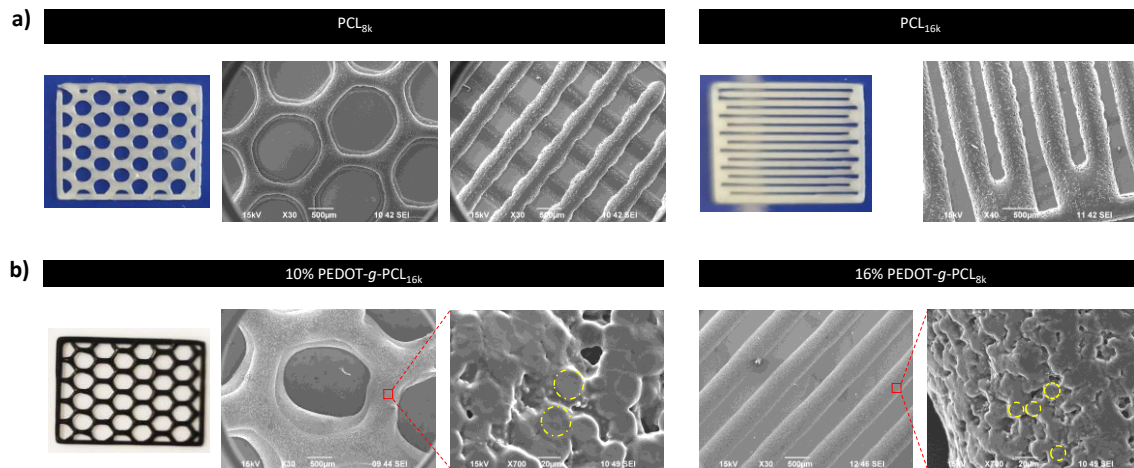

Figure S6. Photographs and SEM images of different printed patterns to show the high-resolution and shapes. a) PCL macromonomers (M_n = 8k and 16k), and their corresponding graft copolymers PEDOT-*g*-PCL$_{8k}$ and PEDOT-*g*-PCL$_{16k}$. Note that yellow circles highlight the size of the crystals.
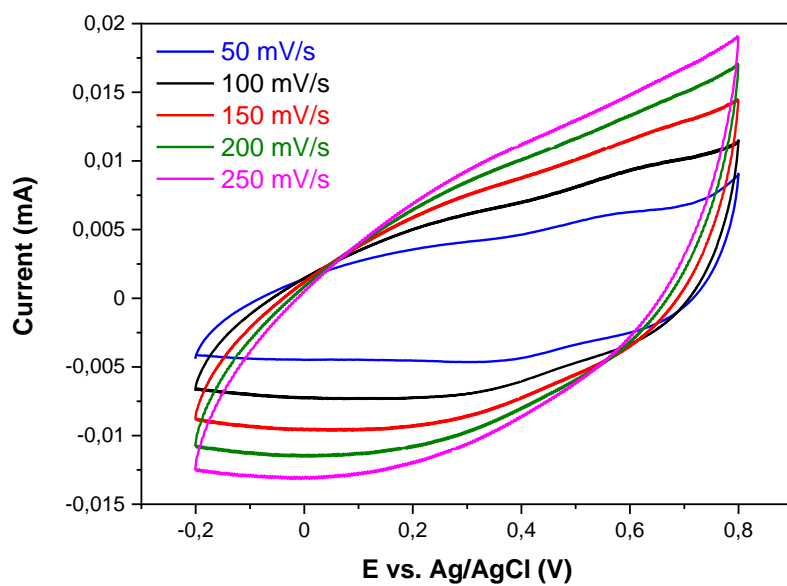
Figure S7. Cyclic voltammograms of 16% PEDOT-*g*-PCL$_{8k}$ at different scan rates, as shown in the legend of the figure.
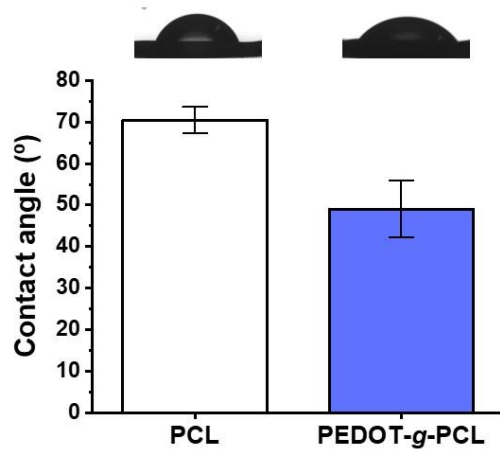

Figure S8. Water contact angle (WCA) of the printed patterns made of PCL$_{16k}$ macromonomer and the graft copolymer 16% PEDOT-*g*-PCL$_{8k}$. Results show the mean ± standard deviation of three samples.