

Electronic Supplementary Information (ESI)

Conductive carbon fabric generation from single-step upcycling of textile waste

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Supplementary material

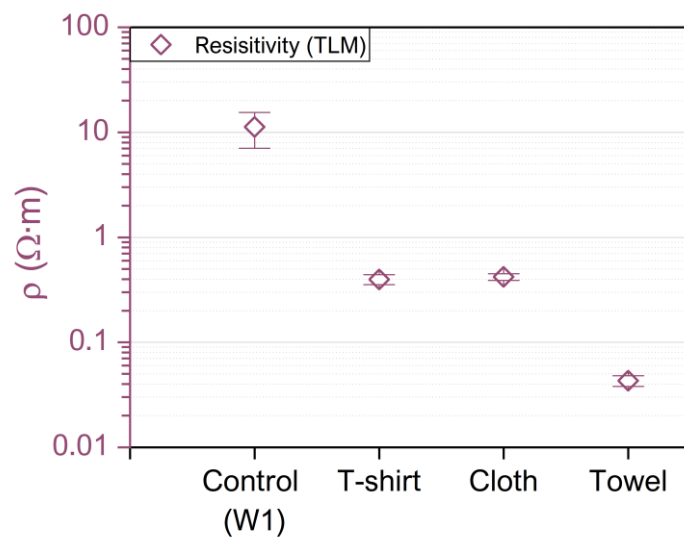


Figure S1. Resistivity values for each carbonized sample. Error bars account for the standard deviation of N=3 measurements.

TLM raw data

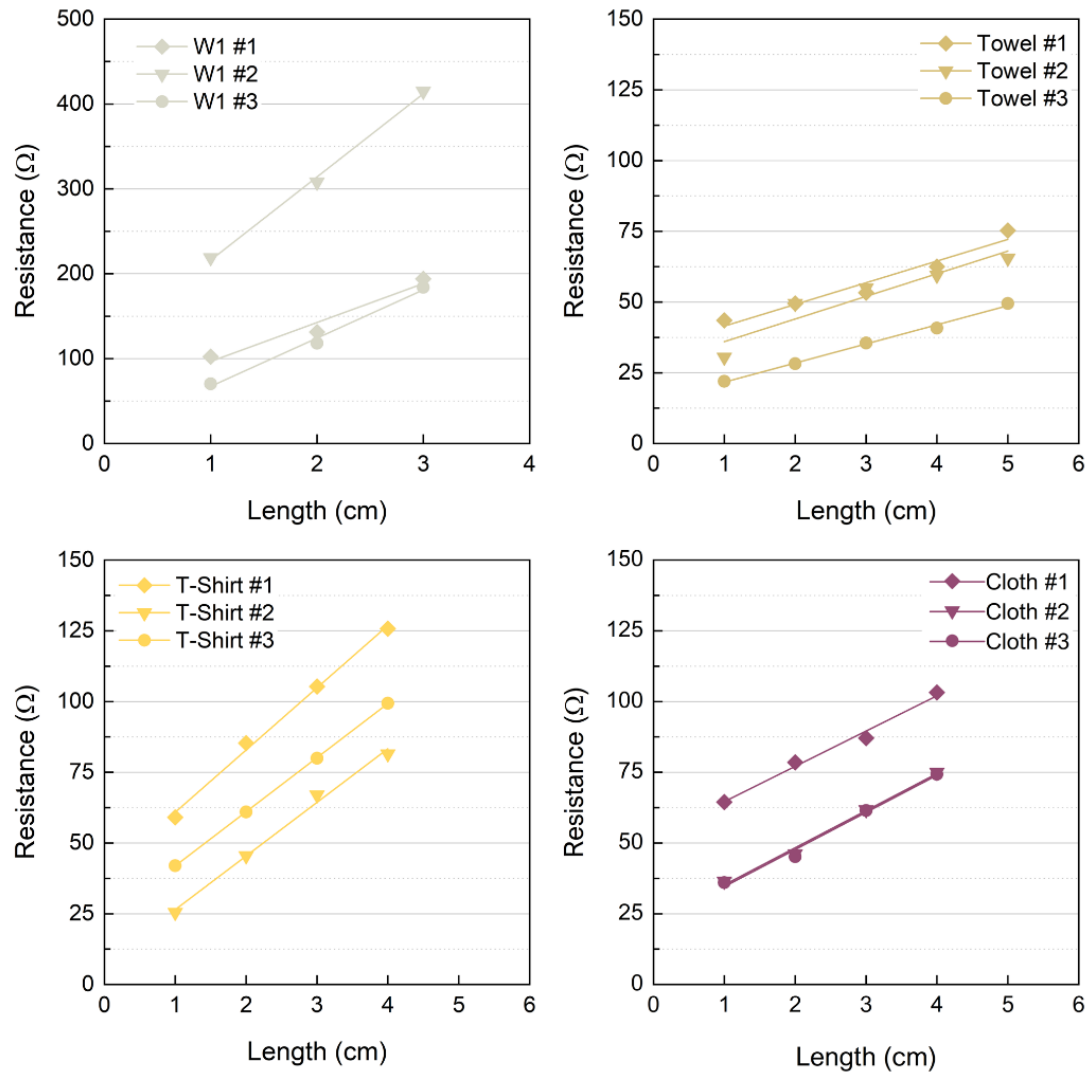


Figure S2. Raw data from TLM measurement for all samples, with each linear fit. Resistivity values are obtained by averaging the slope of each curve.

	Repeat	Intercept	u_n	Slope	u_m	R^2
Control W1	#1	50.7	20.8	45.9	9.6	0.91548
	#2	118.0	11.2	98.0	5.2	0.99439
	#3	10.4	11.3	56.9	5.2	0.98325
T-shirt	#1	38.9	2.8	22.0	1.0	0.99353
	#2	7.5	2.9	19.0	1.1	0.99072
	#3	22.8	0.2	19.1	0.1	0.99996
Towel	#1	33.8	3.3	7.7	1.0	0.93430
	#2	28.0	5.3	8.0	1.6	0.85847
	#3	14.9	0.9	6.8	0.3	0.99360
Cloth	#1	52.2	2.7	12.5	1.0	0.98204
	#2	22.1	2.2	13.1	0.8	0.98873
	#3	21.5	2.6	13.1	0.9	0.98472

Table S1. Values corresponding to the linear fit's regression lines, according to expression of variables: $y=mx+n$, where m is the slope and n the intercept with the Y axis at $x=0$. Thus, u_m and u_n correspond to the uncertainty of each value, respectively.

Contact angle

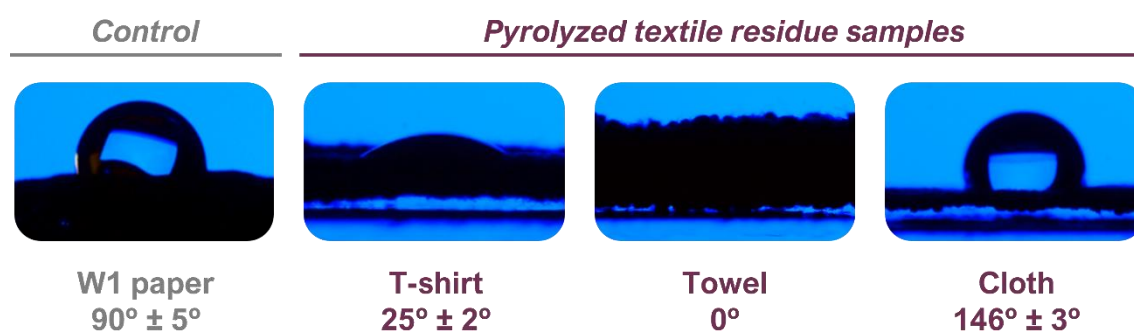


Figure S3. Contact angle results for all the samples. Control W1 is slightly hydrophobic, while Cloth is significantly hydrophobic; on the other side, T-shirt and Towel samples are completely hydrophilic. Specifically, Towel samples adsorbed the water drop instantly, thus is not seen in the picture.

Charge transfer qualitative analysis

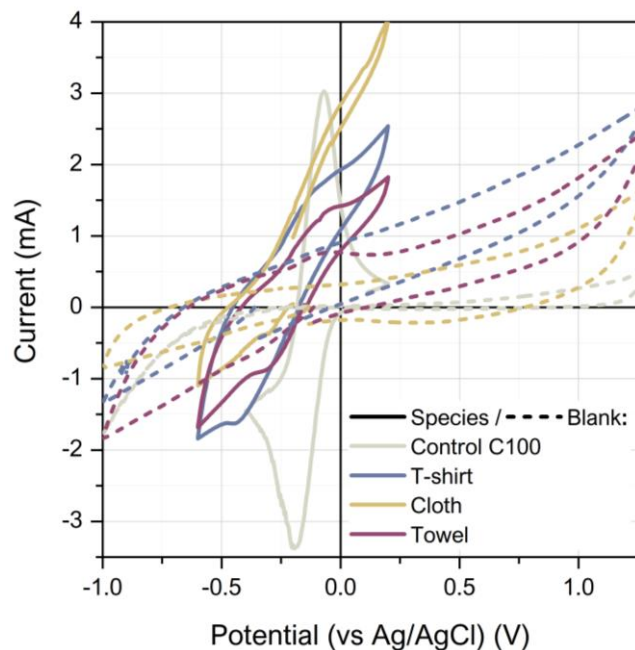


Figure S4. Cyclic voltammograms using the textiles as Working electrode in two different water-based solutions (both with KCl 1M as electrolyte): one with the reversible redox specie p-benzoquinone (solid line), and one only with the electrolyte (dashed lines). Some current is obtained at the operating voltages (between -0.5V and 0.5V) with the blank, but not enough to overshadow the Faradaic currents obtained with the solution containing the redox species.

Proof of concept set-up

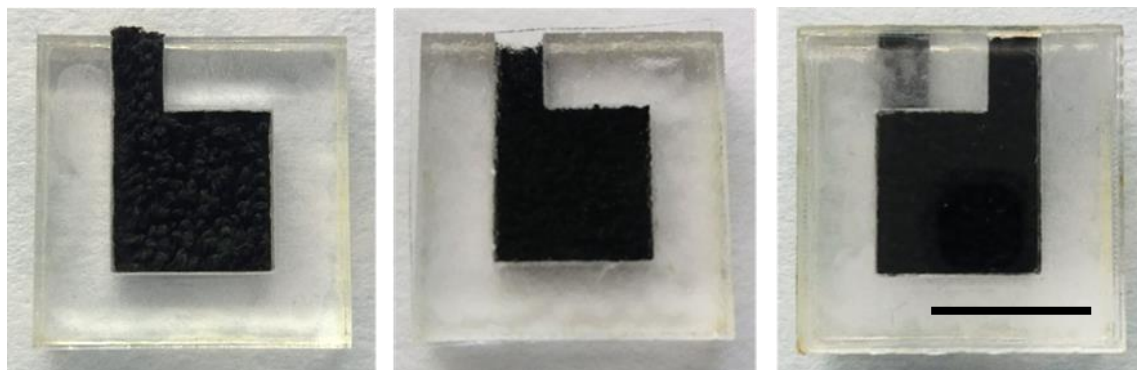


Figure S5. Photograph of the galvanic cell assembly set-up before adding reactants: Left, one side bare; Center, the other side with the ionic membrane; Right, assembled cell. Scale bar = 1 cm (accounts for all pictures).