A Stretchable Laminated GNRs/BNNSs Nanocomposites with High Electrical and Thermal Conductivity

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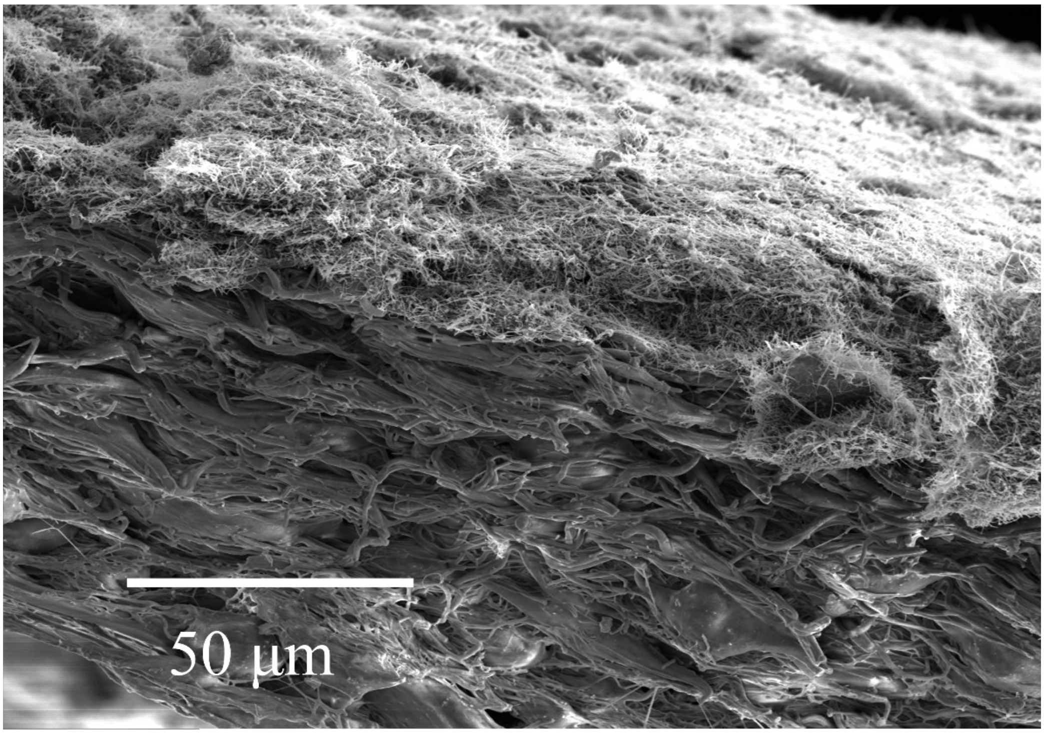


Figure S1 Cross-sectional view of the conductive nanonetworks on electrospinning TPU fibrous membrane in SEM image.

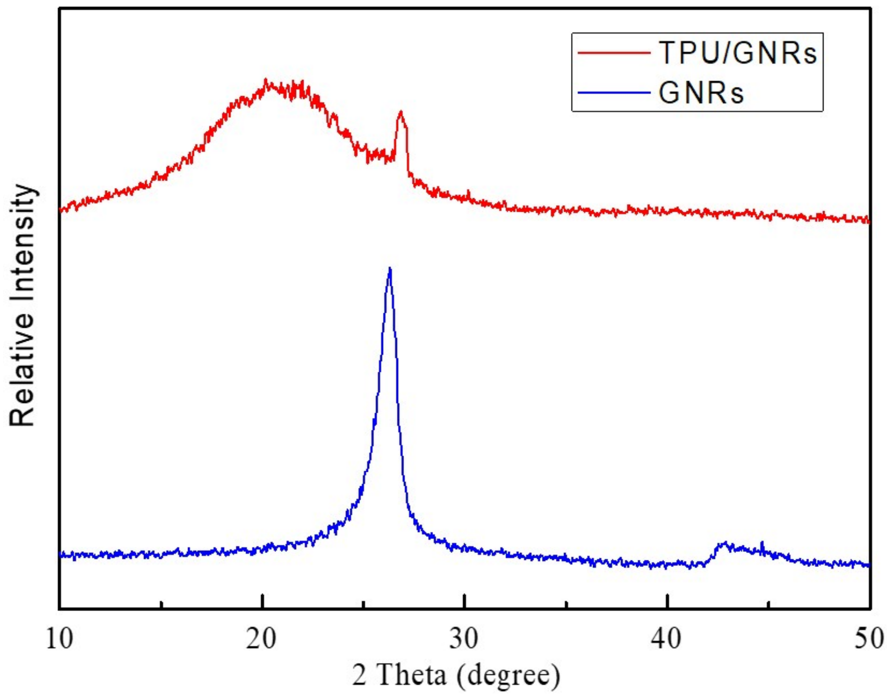


Figure S2 XRD patterns of the GNRs and TPU/GNRs.

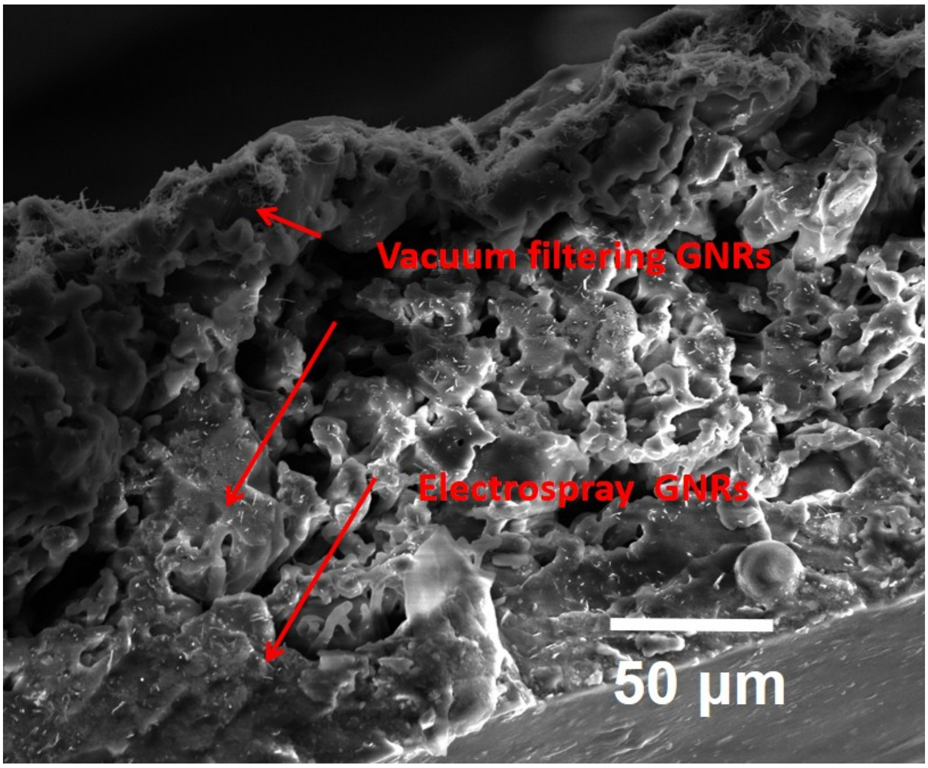


Figure S3 Cross-sectional view of fractured surfaces of GNRs among TPU fibrous mats, from which one can see that the electrospray GNRs nanonetworks are able to contact GNRs deposited via vacuum filtration.

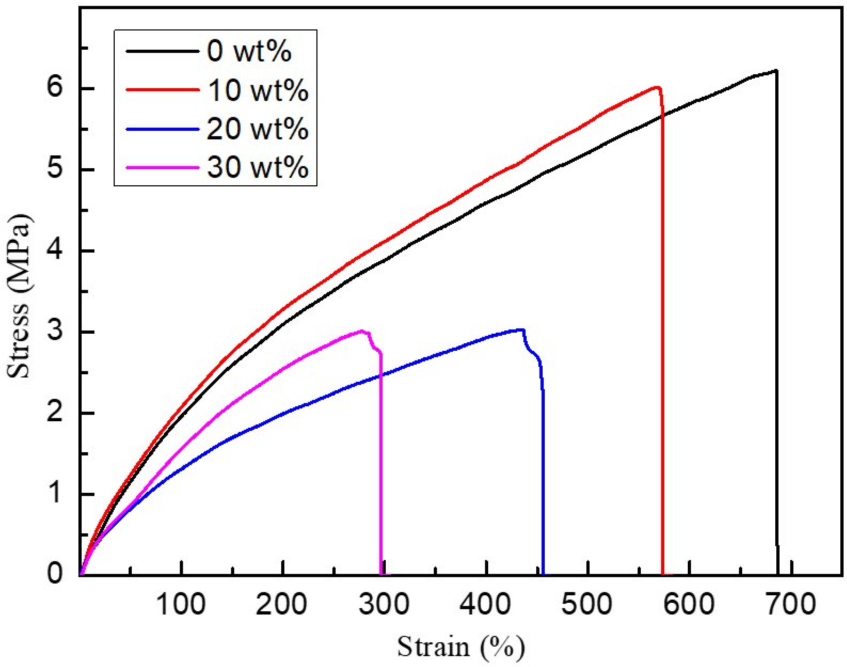


Figure S4 Strain-stress curves of the BNNSs-TPU spin-coating films with BNNSs concentration from 0 to 30 wt %, respectively.

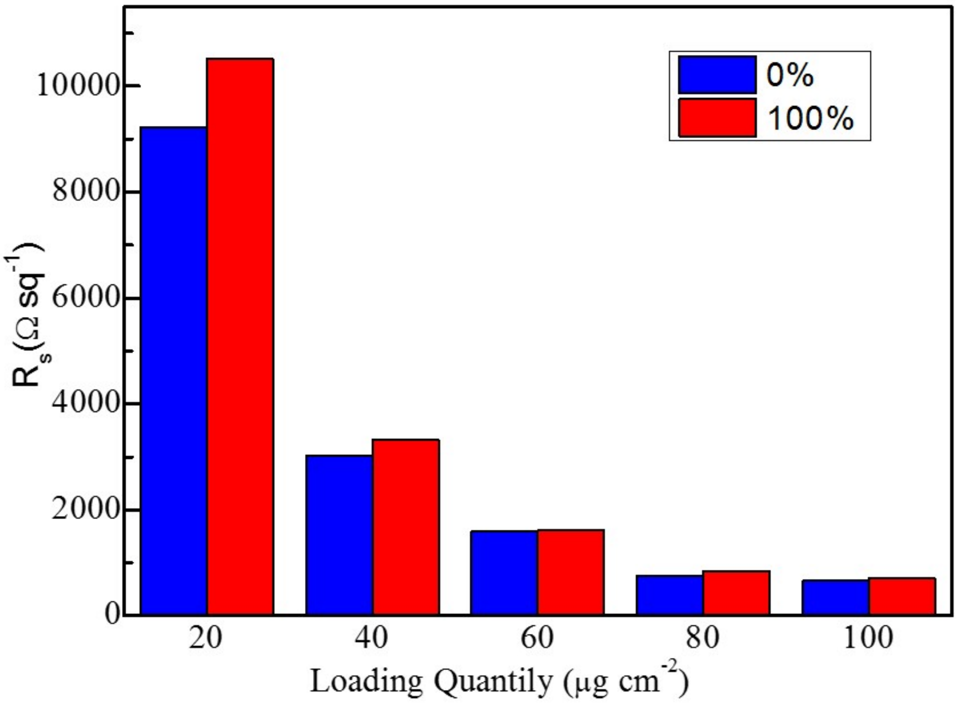


Figure S5 Sheet resistance of nanonetwork with different GNRs contents (from 20 to 100 μg/cm^2) at strain of 0 and 100%, respectively.

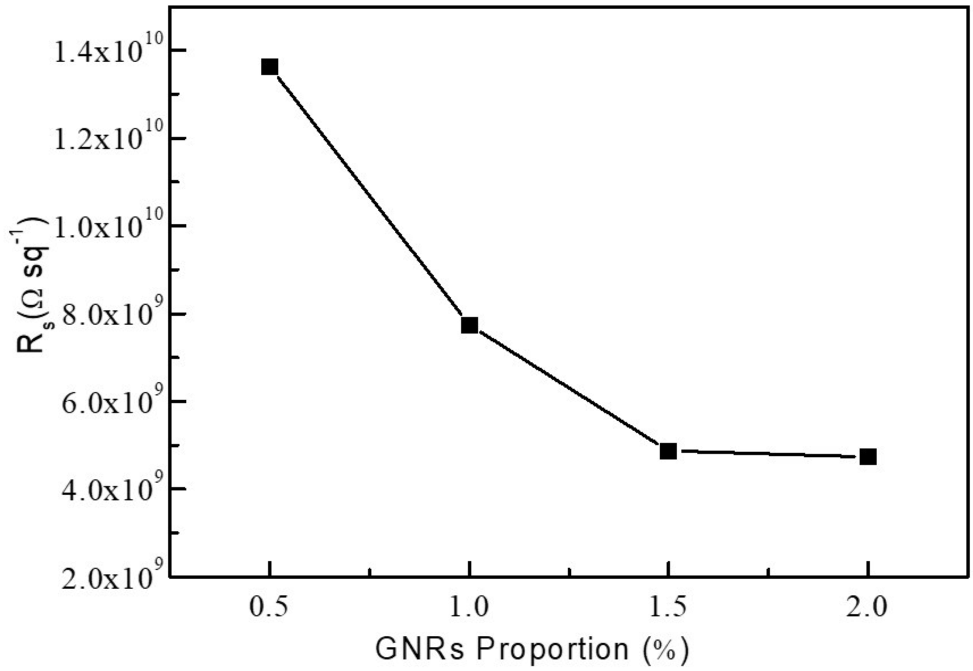
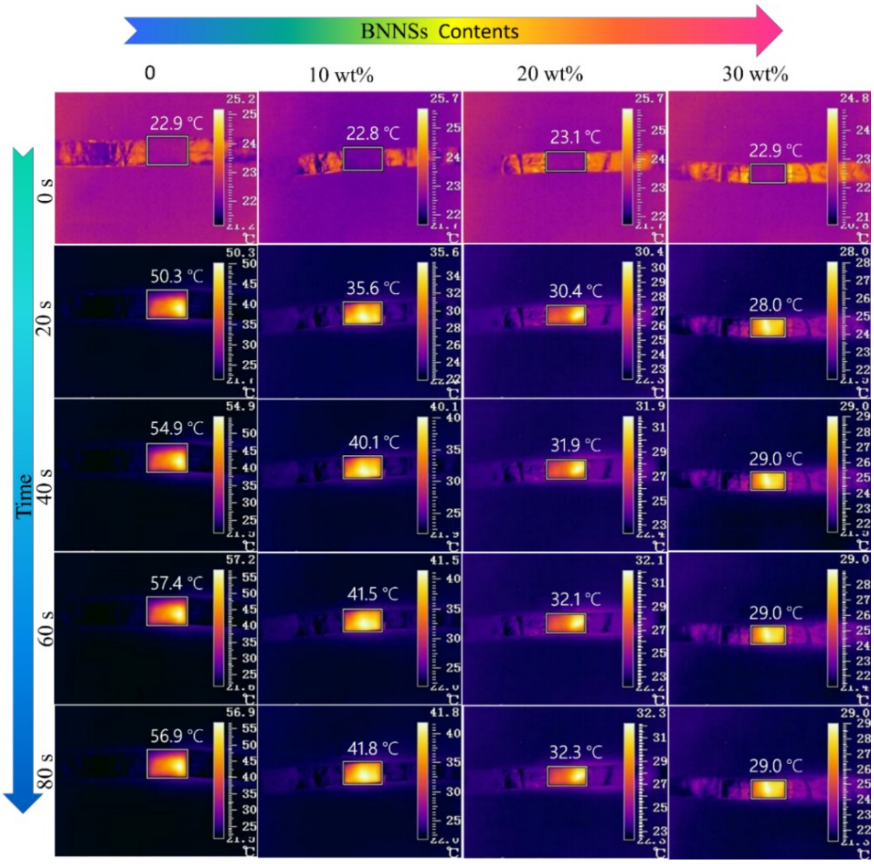


Figure S6 Sheet resistance of electrospun TPU-GNRs nanofibrous mats with GNRs concentration from 0.5 to 2 wt %.



FigureS7 Infrared thermal images of the four types of laminated nanocomposites within 80 s.

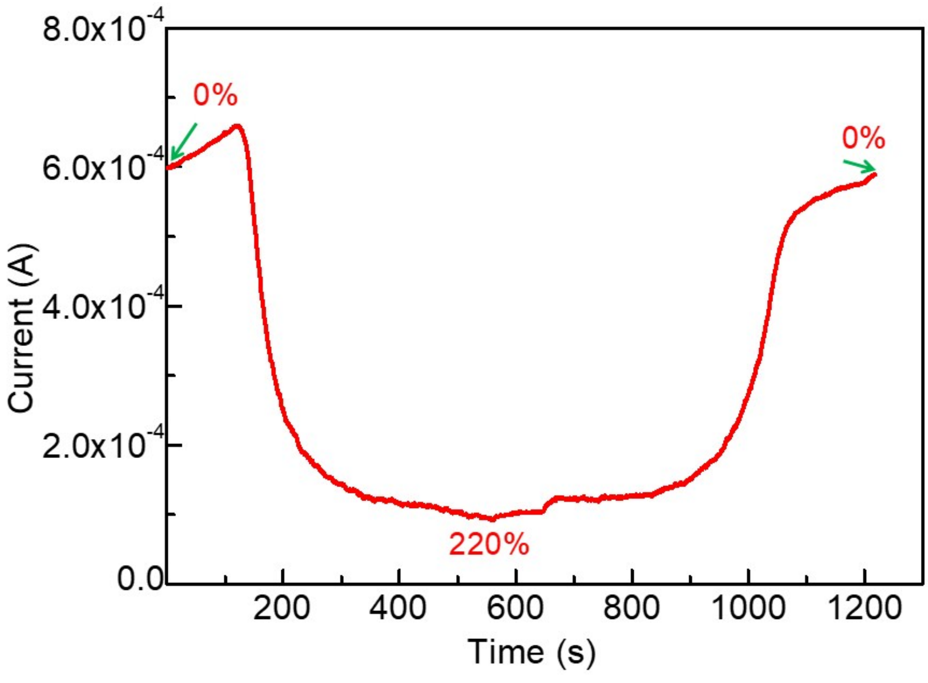


Figure S8 A continuous stretching-releasing process of the laminated nanocomposite between 0 and 220%.

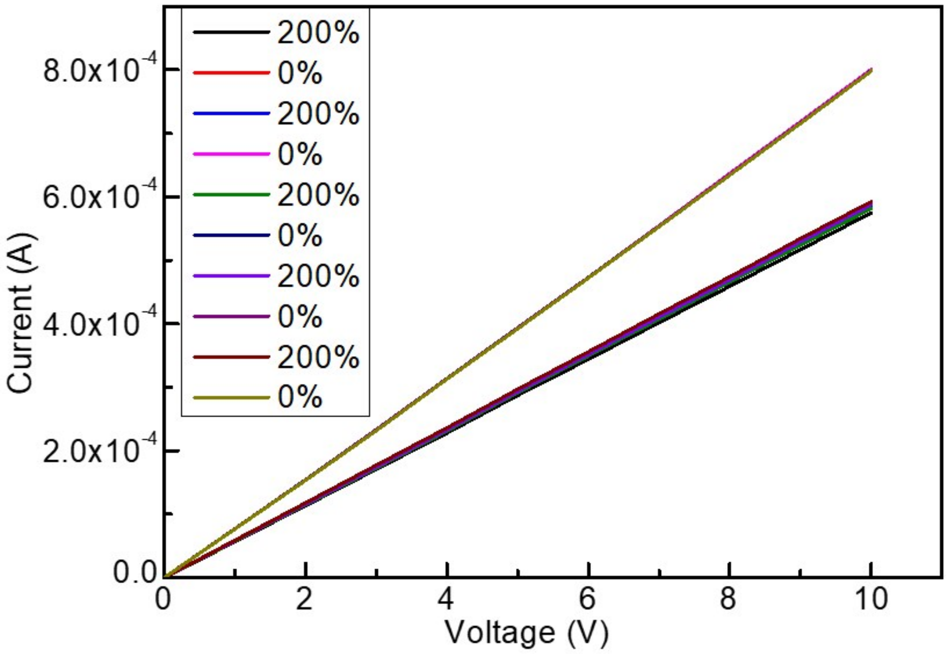


Figure S9 I-V curves of the laminated nanocomposite under 0 and 200 % strains in a Mbius-belt shape.

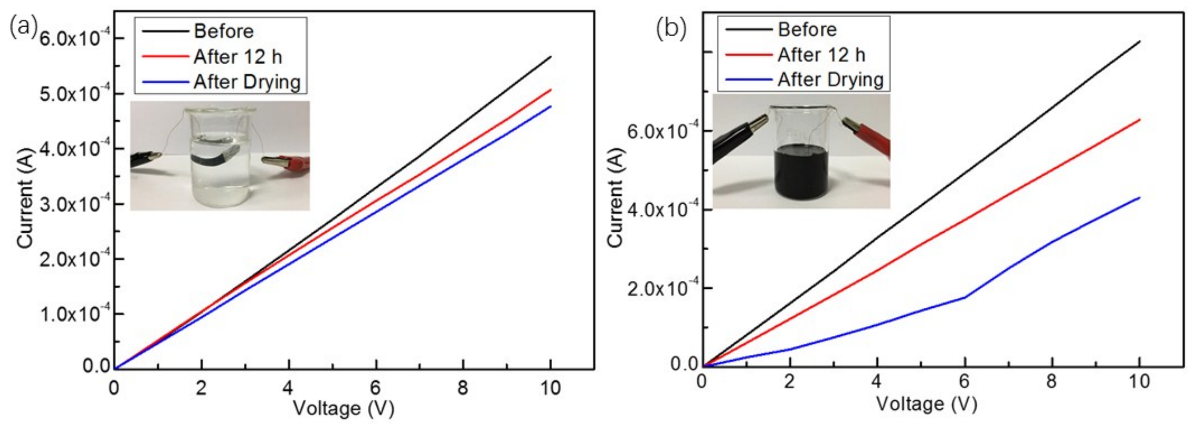


Figure S10 I-V curves of the laminated nanocomposite before and after dipping in (a) sea water and (b) crude oil for 12 h, and after a subsequent drying.

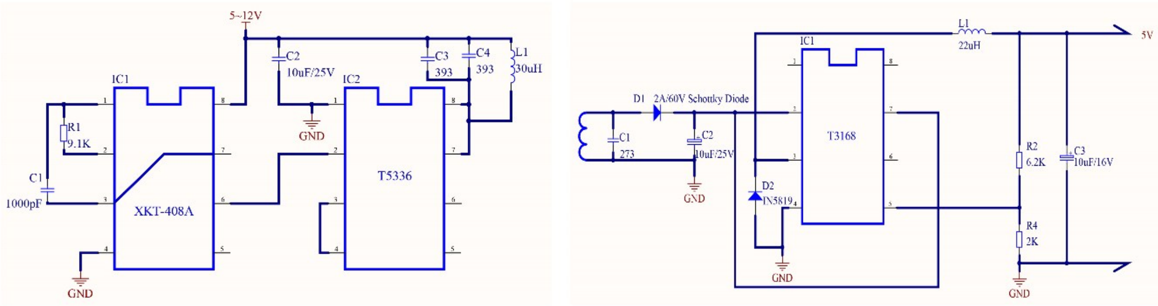


Figure S11 Schematic diagram of the wireless charging circuit.

Table S1 Comparison of properties of stretchable nanocomposites based on carbon materials

No.	Matrix	Conductive Materials	Stretchablity	Normalized Resistance (R/R_0)	Thermal Dissipation	Ref.
1	PMIA	CNTs	220 %	12.8	-	1
2	PI	Graphene	70 %	2.76	-	2
3	Cotton fabric /TPU	Graphene	22.5 %	2.2	-	3
4	VHB acrylic 4910	rGO	100 %	1.22	-	4
5	PDMS	Graphene	60 %	less than 1.6	-	5
6	TPU	CNTs	100 %	1.6	-	6
7	PDMS	CNT-PAA	100 %	2.5	-	7
8	SIS	rGO-Ni-Graphene	300 %	11.4	-	8
9	PDMS	CNTs-Graphene	100 %	2.4	-	9
10	PDMS	Graphene-PEDOT:PSS	80 %	1.35	-	10
11	PDMS	SWNTs@PEDOT	50 %	1.27	-	11
12	TPU	GNRs	200 %	1.46	Yes	This work

[- present not given].

Abbreviations: PMIA, Poly(m-phenylene isophthalamide); PDMS, Poly(dimethylsiloxane); PI, polyimide; rGO, Reduced Graphene Oxide; PAA, Polyacrylic acid; SIS, Polystyrene-polyisoprene-polystyrene; PEDOT, Poly(3,4-ethylenedioxythiophene); PSS, Poly(sodium-p-styrenesulfonate).

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