Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Table S1. The mass loadings and the corresponding areal specific capacitances of conducting polymers and MnO_2 within supercapacitors using porous frameworks.

Active material	Mass loading (mg cm^{-2})	Areal specific capacitance (mF cm^{-2})	Reference
PPy	1.5	504	[1]
	6	1404	[1]
	7.26	1089	[2]
	3.54	420	[3]
	1.02	387.6	[4]
	0.14	35.7	[5]
	5.27	1214	[6]
PANI	1.67	1800	[7]
	0.45	184.5	[8]
	5.2	3500	[9]
	4.7	2070	[10]
	1.4	800	[11]
	0.31	317	[12]
	0.3	132	[13]
	1	751.3	[14]
	4.75	2245	[14]
	6.28	2300	[15]
PEDOT	4.34	325.5	[16]
	0.55	85	[17]
MnO_2	0.54	230	[18]
	1.3	400	[19]
	8.3	2800	[20]
	0.562	109	[21]
	0.31	193.75	[22]

PPy: polypyrrole; PANI: polyaniline; PEDOT: poly (3,4-ethylenedioxythiophene); MnO_2: manganese oxide.

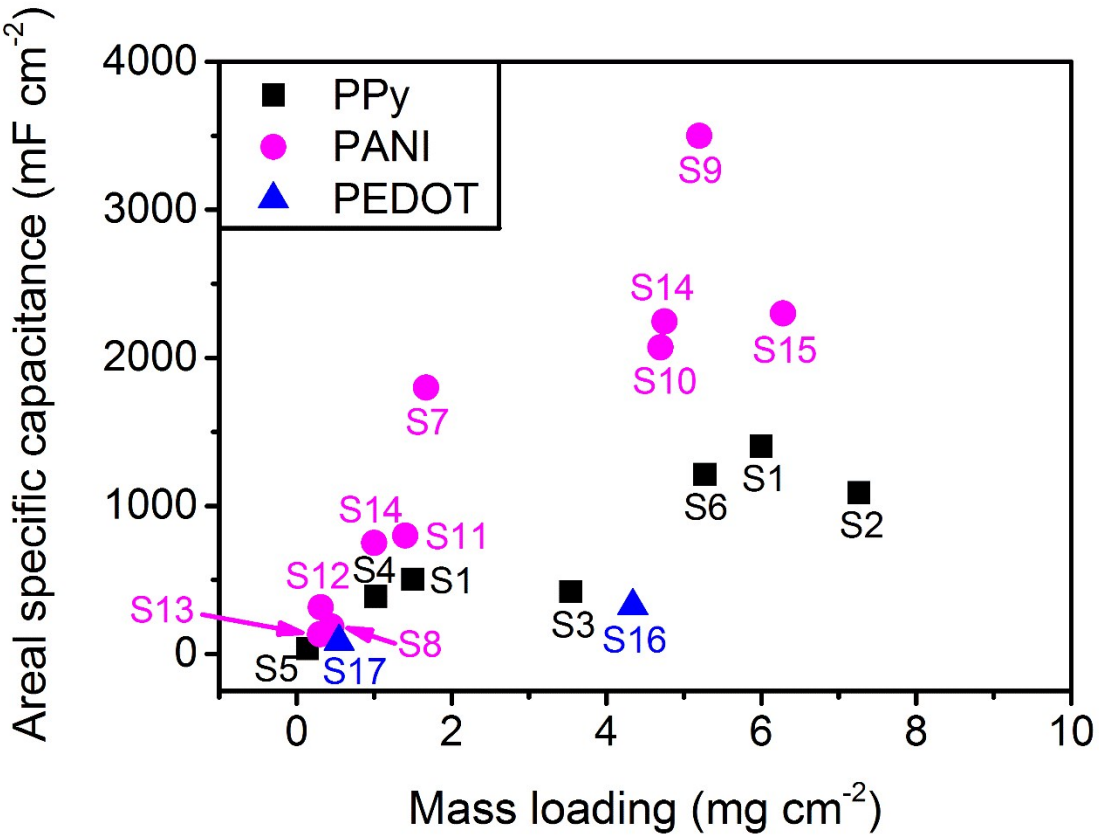

Figure S1. The mass loadings and the corresponding areal specific capacitances of conducting polymers within supercapacitors using porous frameworks (data extracted from Table S1).

Figure S2. Cellulose fibers with an irregular section used to construct fabrics.

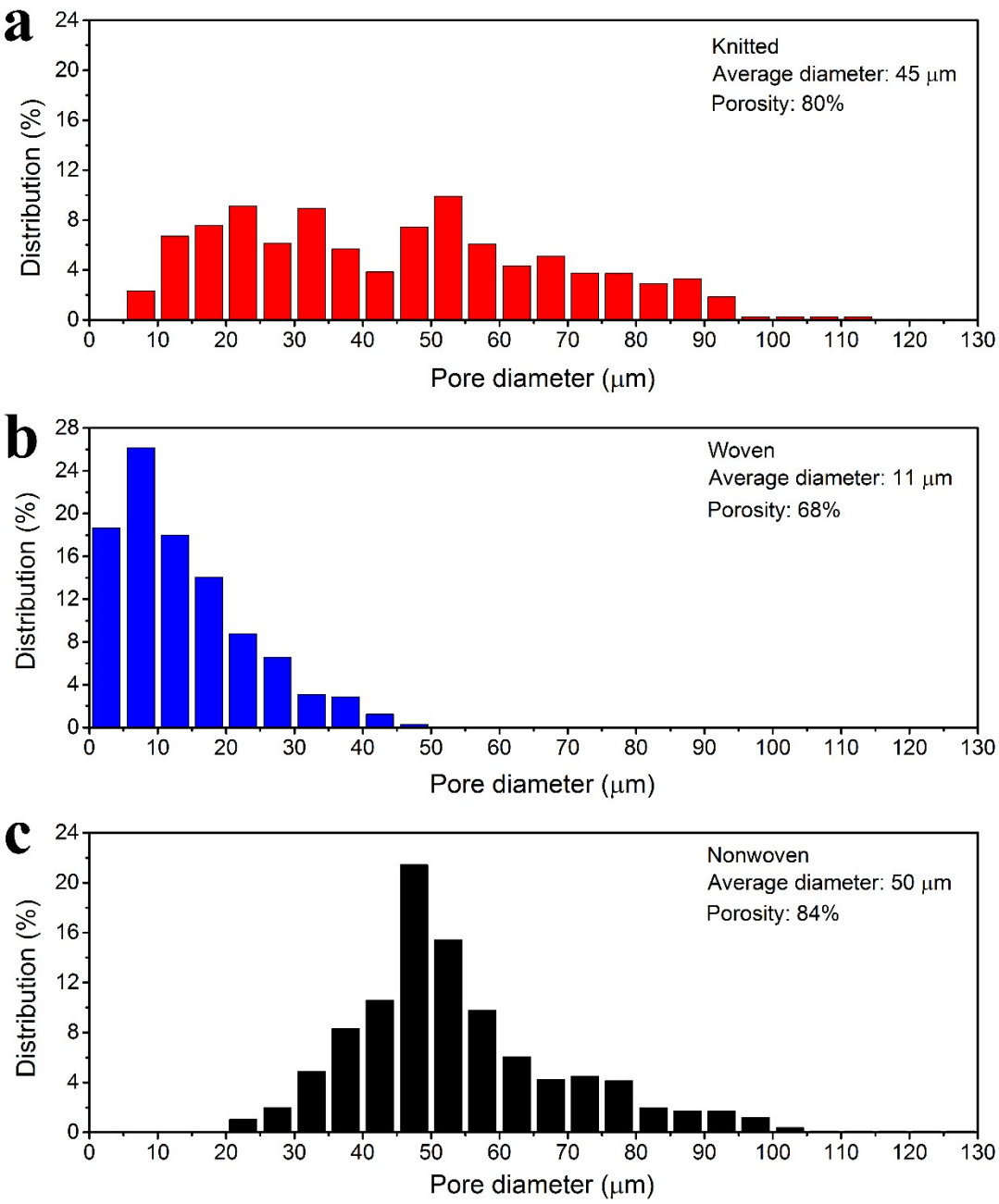

Figure S3. The porosities and pore size distributions of knitted, woven and nonwoven bare fabrics.

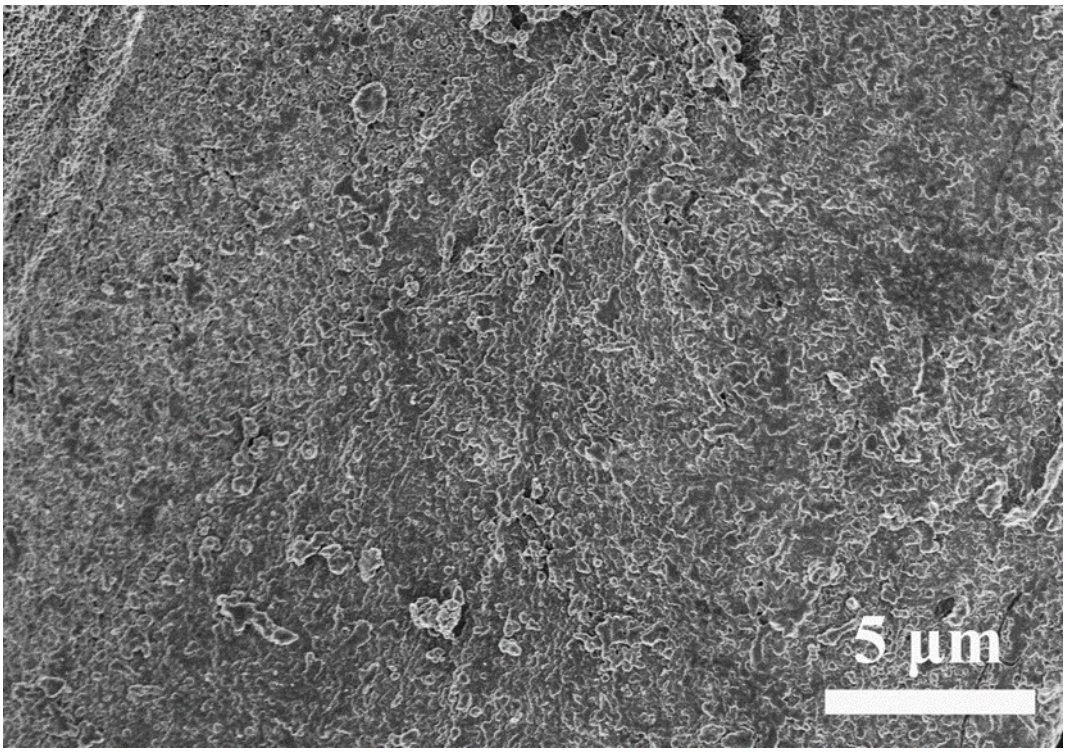

Figure S4. A high-magnification SEM image of PPy-coated cellulose fiber in PPy-coated knitted fabric with a PPy mass loading of 12.3 mg cm^{-2}.

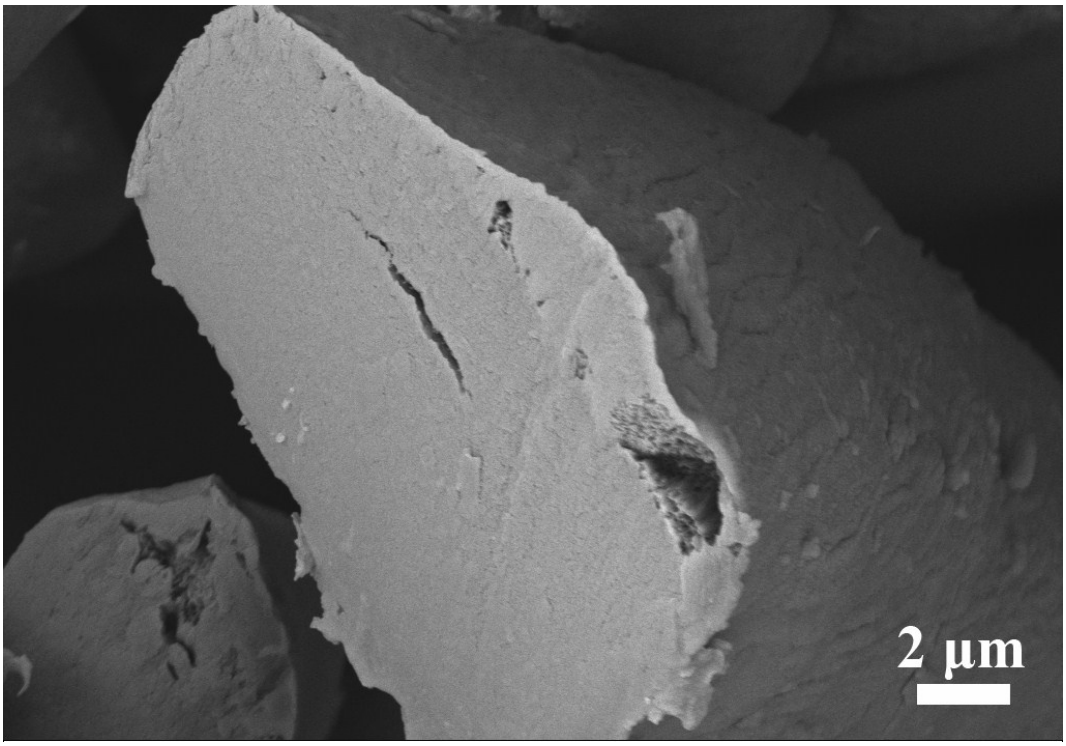

Figure S5. A cross-sectional SEM image of PPy-coated cellulose fiber in PPy-coated knitted fabric with a PPy mass loading of 12.3 mg cm^{-2}.

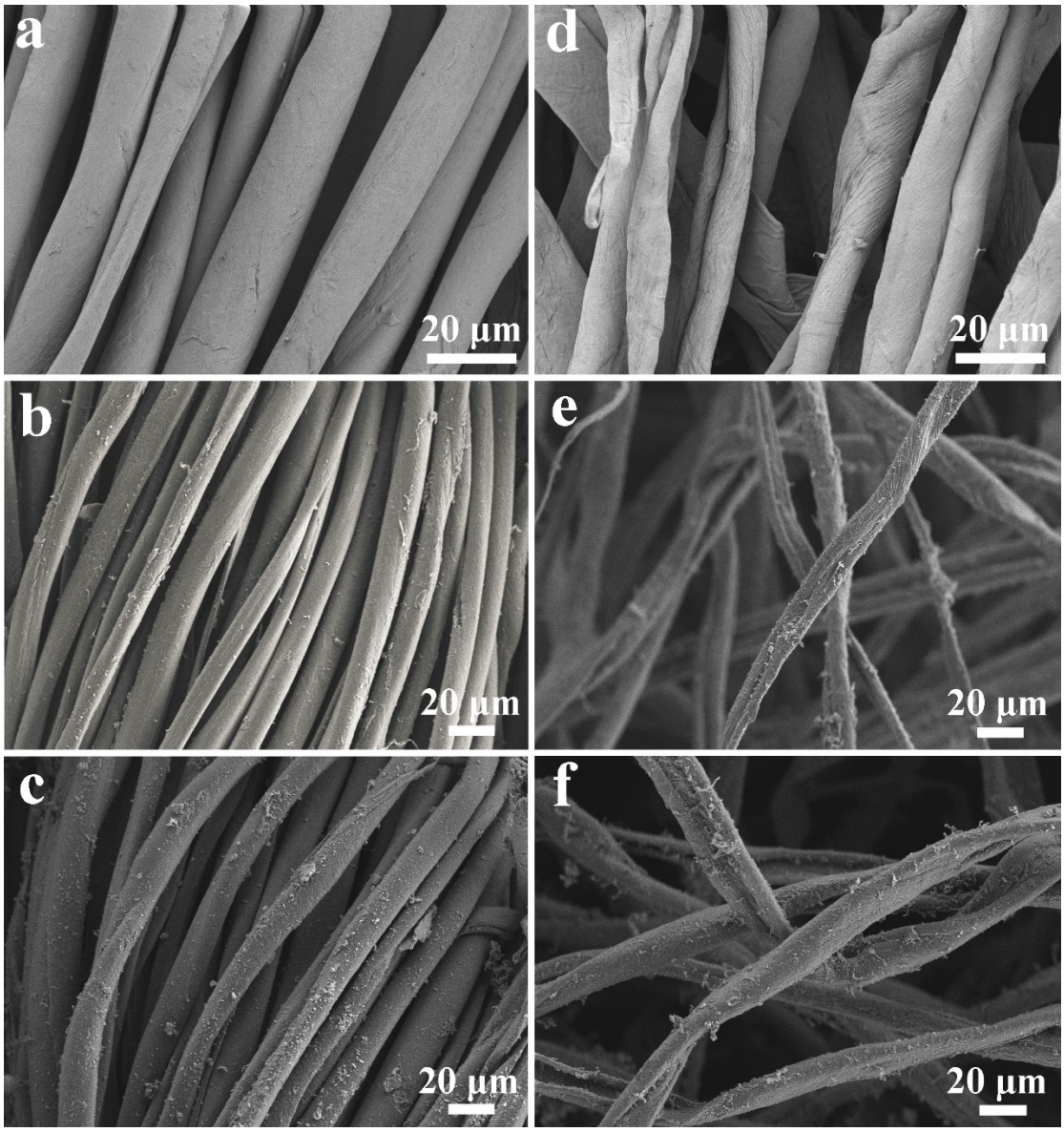

Figure S6. (**a-c**) Woven fabrics with the PPy mass loadings of 0, 2.58 and 5.88 mg cm^{-2}, respectively. (**d-f**) Nonwoven fabrics with the PPy mass loadings of 0, 3.03 and 7.17 mg cm^{-2}, respectively.

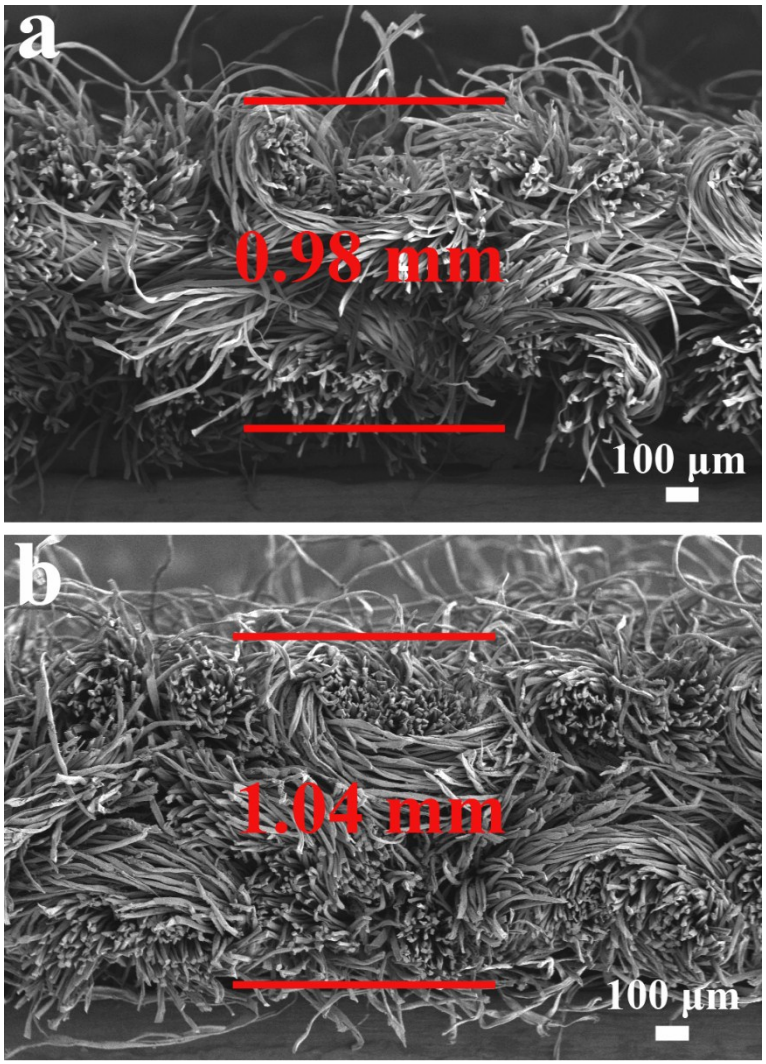

Figure S7. Cross-sectional SEM images of (**a**) bare knitted fabric and (**b**) PPy-coated knitted fabric with a mass loading of 12.3 mg cm^{-2}.

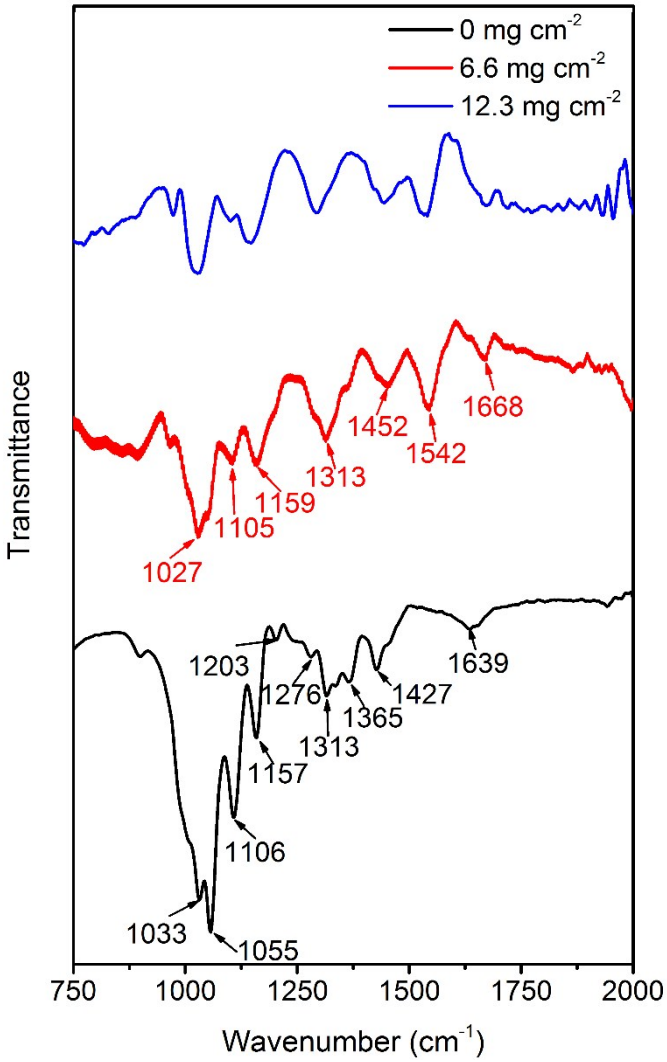

Figure S8. Fourier transform infrared (FTIR) spectroscopy characterization of bare and PPy-coated knitted fabrics.

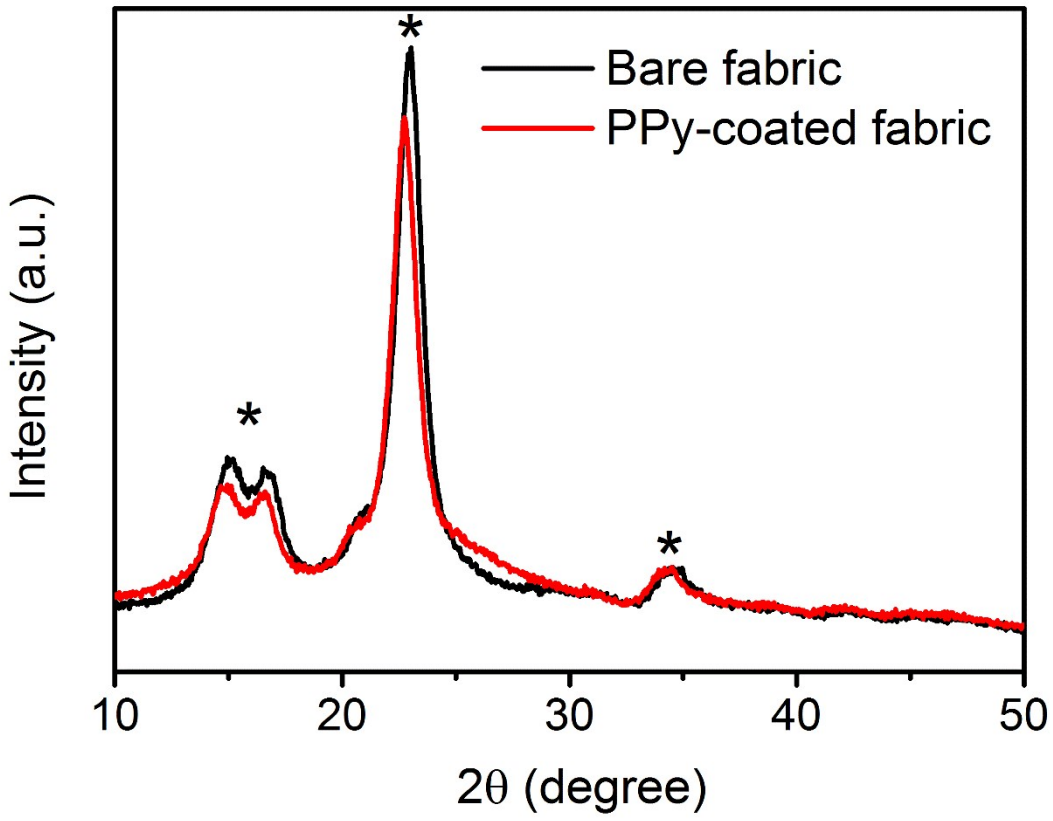

Figure S9. X-ray diffraction (XRD) spectrum of bare and PPy-coated fabrics.

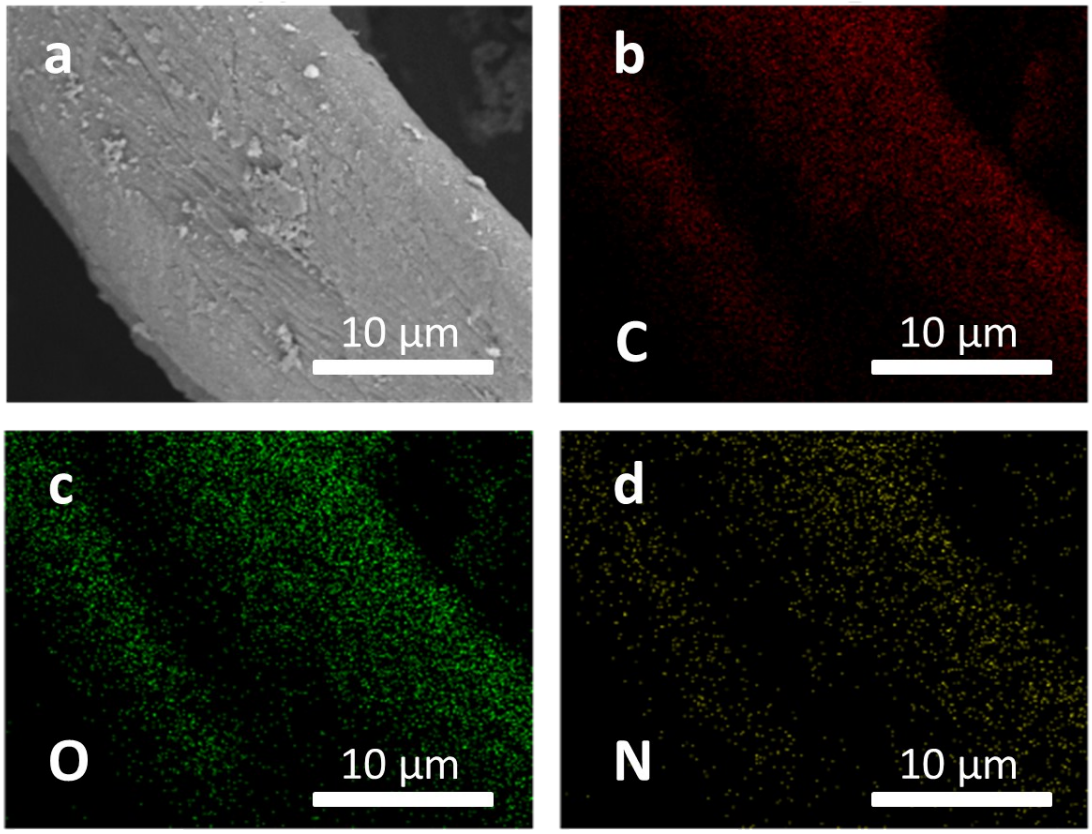

Figure S10. Energy dispersive spectroscopy (EDS) characterization of PPy-coated fiber in PPy-coated knitted fabric with a mass loading of 12.3 mg cm^{-2}. (**a**) SEM image. The mapping images of (**b**) C, (**c**) O and (**d**) N.

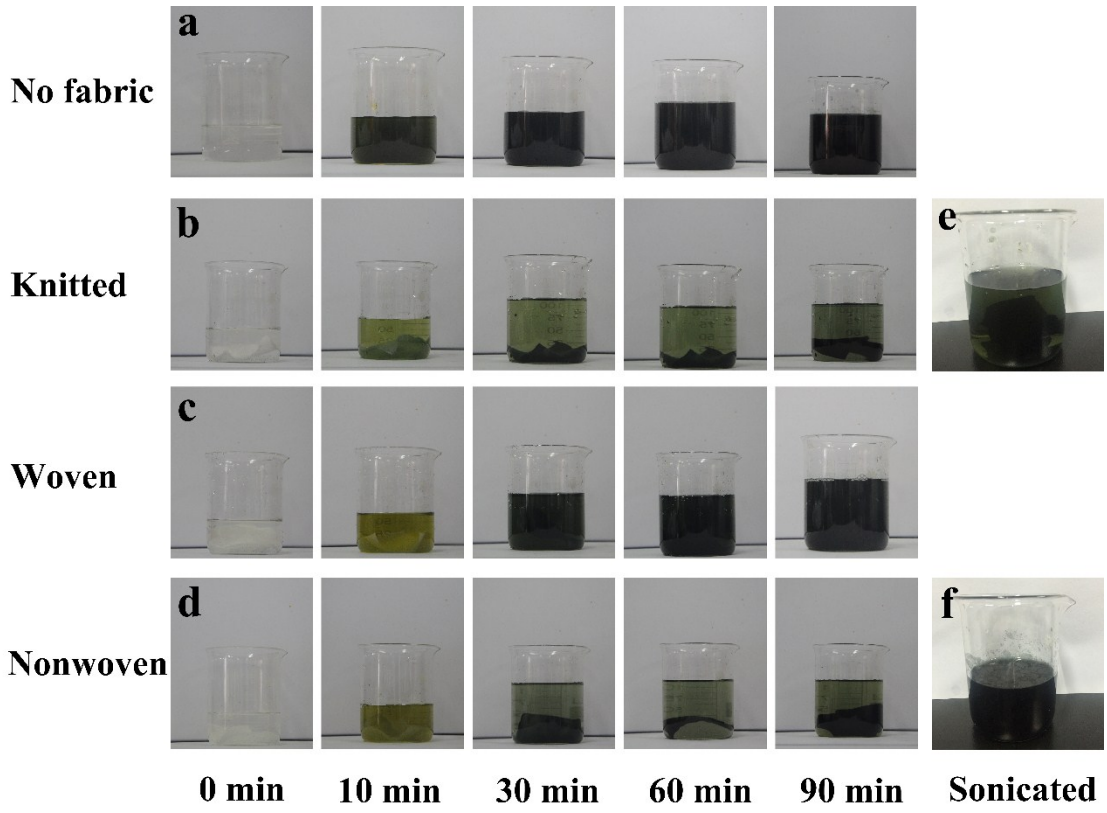

Figure S11. Photographs of the polymerization process of pyrrole solutions (**a**) without fabric, (**b**) with a knitted fabric, (**c**) with a woven fabric and (**d**) with a nonwoven fabric. (**e**) Pyrrole solution with a knitted fabric undergoing 90 min polymerization after ultrasonic treatment for 5 min. (**f**) Pyrrole solution with a nonwoven fabric undergoing 90 min polymerization after ultrasonic treatment for 5 min. The pyrrole concentrations for all solutions are the same of 0.2 mol L^{-1}.

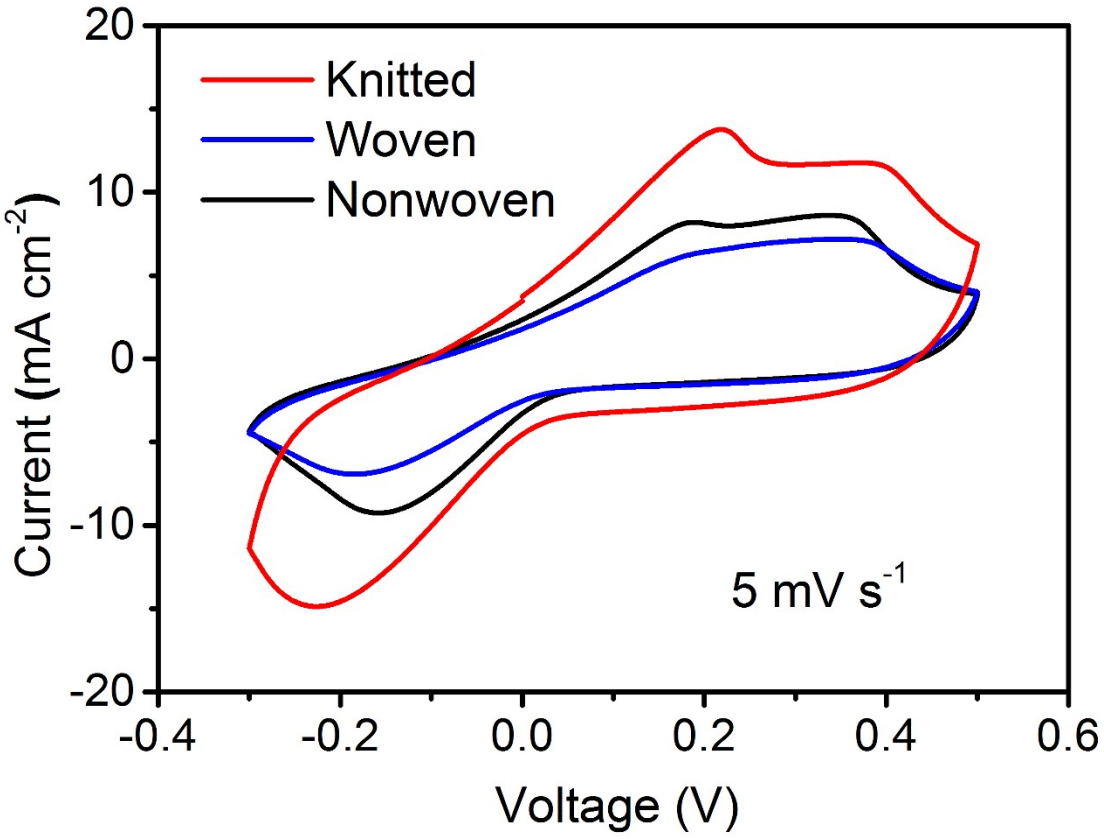

Figure S12. Cyclic voltammograms for PPy-coated knitted, woven and nonwoven fabrics. They were prepared from the same pyrrole concentration of 0.20 mol L^{-1}.

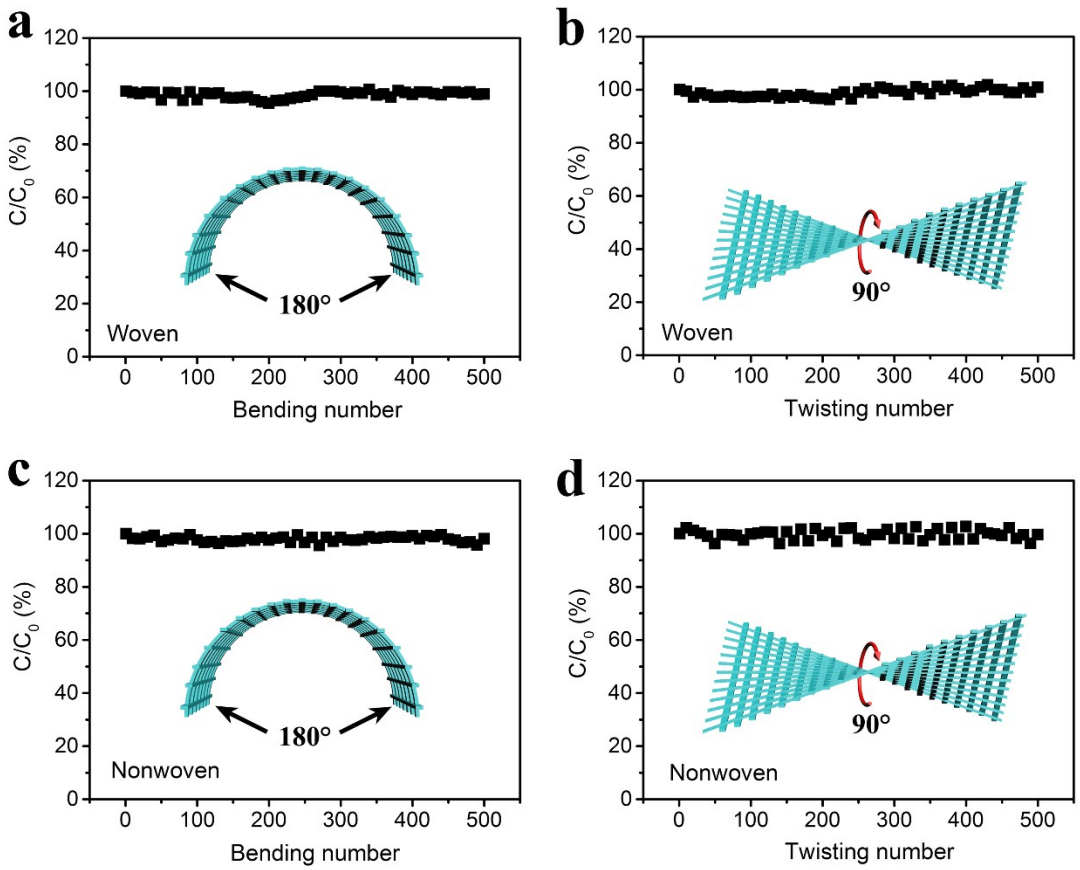

Figure S13. Flexibility of the supercapacitor assembled from the same two PPy-coated woven fabrics under (**a**) bending and (**b**) twisting. The PPy mass loading was 5.88 mg cm^{-2}. Flexibility of the supercapacitor assembled from the same two PPy-coated nonwoven fabrics under (**c**) bending and (**d**) twisting. The PPy mass loading was 7.17 mg cm^{-2}.

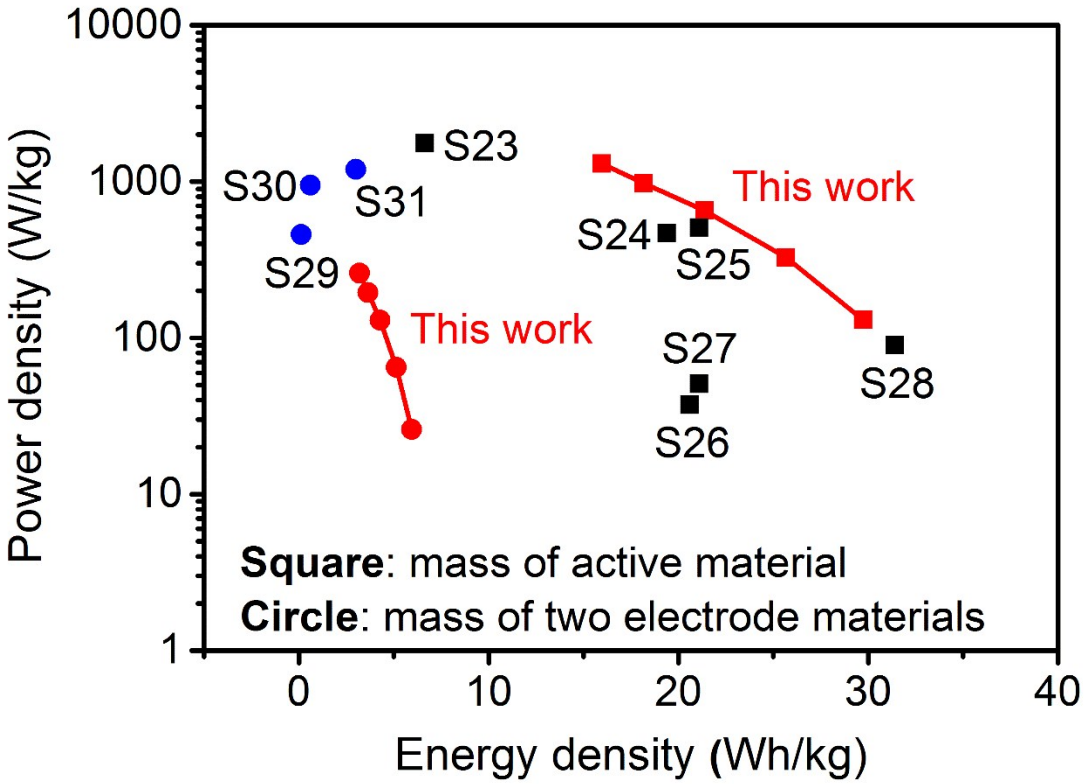

Figure S14. Ragone plot of the proposed supercapacitor compared with previous supercapacitors using fabrics as the template.

References for the Supporting Information

S1. J. Xu, D. Wang, Y. Yuan, W. Wei, L. Duan, L. Wang, H. Bao and W. Xu, *Org. Electron.*, 2015, **24**, 153.

S2. Z. Wang, P. Tammela, M. Stromme and L. Nyholm, *Nanoscale*, 2015, **7**, 3418.

S3. L. Yuan, B. Yao, B. Hu, K. Huo, W. Chen and J. Zhou, *Energy Environ. Sci.*, 2013, **6**, 470.

S4. J. Cao, Y. Wang, J. Chen, X. Li, F. C. Walsh, J.-H. Ouyang, D. Jia and Y. Zhou, *J. Mater. Chem. A*, 2015, **3**, 14445.

S5. B. Yue, C. Wang, X. Ding and G. G. Wallace, *Electrochim. Acta*, 2013, **113**, 17.

S6. J. Xu, D. Wang, L. Fan, Y. Yuan, W. Wei, R. Liu, S. Gu and W. Xu, *Org. Electron.*, 2015, **26**, 292.

S7. Y.-Y. Horng, Y.-C. Lu, Y.-K. Hsu, C.-C. Chen, L.-C. Chen and K.-H. Chen, *J. Power Sources*, 2010, **195**, 4418.

S8. K. Wang, P. Zhao, X. Zhou, H. Wu and Z. Wei, *J. Mater. Chem.*, 2011, **21**, 16373.

S9. Q. Cheng, J. Tang, J. Ma, H. Zhang, N. Shinya and L.-C. Qin, *J. Phys. Chem. C*, 2011, **115**, 23584.

S10. S. Y. Liew, W. Thielemans and D. A. Walsh, *J. Solid State Electrochem.*, 2014, **18**, 3307.

S11. L. Yuan, X. Xiao, T. Ding, J. Zhong, X. Zhang, Y. Shen, B. Hu, Y. Huang, J. Zhou and Z. L. Wang, *Angew. Chem. Int. Ed.*, 2012, **51**, 4934.

S12. S. B. Kulkarni, U. M. Patil, I. Shackery, J. S. Sohn, S. Lee, B. Park and S. Jun, *J. Mater. Chem. A*, 2014, **2**, 4989.

S13. G. Otrokhov, D. Pankratov, G. Shumakovich, M. Khlupova, Y. Zeifman, I. Vasil'eva, O. Morozova and A. Yaropolov, *Electrochim. Acta*, 2014, **123**, 151.

S14. M. Yu, Y. Ma, J. Liu and S. Li, *Carbon*, 2015, **87**, 98.

S15. C. Tran, R. Singhal, D. Lawrence and V. Kalra, *J. Power Sources*, 2015, **293**, 373.

S16. A. Laforgue, *J. Power Sources*, 2011, **196**, 559.

S17. G. P. Pandey, A. C. Rastogi and C. R. Westgate, *J. Power Sources*, 2014, **245**, 857.

S18. Y.-C. Chen, Y.-K. Hsu, Y.-G. Lin, Y.-K. Lin, Y.-Y. Horng, L.-C. Chen and K.-H. Chen, *Electrochim. Acta*, 2011, **56**, 7124.

S19. G. Yu, L. Hu, M. Vosgueritchian, H. Wang, X. Xie, J. R. McDonough, X. Cui, Y. Cui and Z. Bao, *Nano Lett*, 2011, **11**, 2905.

S20. L. Hu, W. Chen, X. Xie, N. Liu, Y. Yang, H. Wu, Y. Yao, M. Pasta, H. N. Alshareef and Y. Cui, *ACS Nano*, 2011, **5**, 8904.

S21. L. Yuan, X.-H. Lu, X. Xiao, T. Zhai, J. Dai, F. Zhang, B. Hu, X. Wang, L. Gong, J. Chen, C. Hu, Y. Tong, J. Zhou and Z. L. Wang, *ACS Nano*, 2012, **6**, 656.

S22. M. Yu, T. Zhai, X. Lu, X. Chen, S. Xie, W. Li, C. Liang, W. Zhao, L. Zhang and Y. Tong, *J. Power Sources*, 2013, **239**, 64.

S23. K. Wang, P. Zhao, X. Zhou, H. Wu and Z. Wei, *J. Mater. Chem.*, 2011, **21**, 16373.

S24. J. Xu, D. Wang, L. Fan, Y. Yuan, W. Wei, R. Liu, S. Gu and W. Xu, *Org. Electron.*, 2015, **26**, 292.

S25. X. Bai, X. Hu and S. Zhou, *RSC Adv.*, 2015, **5**, 43941.

S26. L. Zhu, L. Wu, Y. Sun, M. Li, J. Xu, Z. Bai, G. Liang, L. Liu, D. Fang and W. Xu, *RSC Adv.*, 2013, **4**, 6261.

S27. J. Xu, D. Wang, Y. Yuan, W. Wei, L. Duan, L. Wang, H. Bao and W. Xu, *Org. Electron.*, 2015, **24**, 153.

S28. P. Tang, L. Han and L. Zhang, *ACS Appl. Mater. Inter.*, 2014, **6**, 10506.

S29. Y. J. Kang, H. Chung, C. H. Han and W. Kim, *Nanotechnology*, 2012, **23**, 123.

S30. A. Razaq, L. Nyholm, M. Sjödin, M. Strømme and A. Mihranyan, *Adv. Energy Mater.*, 2012, **2**, 445.

S31. Z. Wang, P. Tammela, P. Zhang, M. Strømme and L. Nyholm, *J. Mater. Chem. A*, 2014, **2**, 7711.