Supplementary information

SERS-active substrates assembled by Ag NWs-embedded porous polystyrene fibers

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Table S1. Summary of the flexible SERS substrates based on metallic nanomaterials and electrospun polymer fibers

Electrospun polymer	metallic nanomaterial	Composite mode	Probing molecule	Limit of detection	Reference
PVA	Ag NPs	Embedded	4-mercaptobenzoic acid (4-MBA)	10^{-9} M	**1.** *ACS Nano*,2009, 3, 3993.
PVA	Au NPs	Embedded	4-MBA	10^{-7} M	**2.** *J Polym. Res.*, 2012, 19, 9810.
PVA	Gold Nanorods	Embedded	3,3′-diethylthiatricarbocyanine iodide (DTTCI)	10^{-7} M	**3.** *Small*, 2012, 8, 648.
PVP	Ag Nanowires	Embedded	4,4′-bipyridine	5 mg/ml (3.2×10^{-2} M)	**4.** *Small*, 2012, 8, 2936.
PVA	Au nanorods with Ag nanowires	Embedded	DTTCI	10^{-7} M	**5.** *Nanoscale*, 2012, 4, 5348.
PAN	Ag NPs	immobilized onto fibers	Rhodamine 6G (R6G)	10 ppb	**6.** *Langmuir*, 2012, 28, 14433.
PAN	Ag nanocrystals	immobilized onto fibers	4-MBA & 4-ATP	10^{-9} M & 10^{-10} M	**7.** *Analyst*, 2015, 140, 5190
PLLA	CTAB-coated gold nanorods	immobilized onto fibers	R6G and malachite green	0.1 nM	**8.** *ACS Appl. Mater. Interfaces*, 2015, 7, 5391.
PS	Ag NPs	immobilized onto fibers	R6G & carbofuran	10^{-7} M	**9.** *Anal. Methods*, 2017, 9, 3998–4003
PAA/PVA composite fiber	Gold nanoparticle	immobilized onto fibers	4-ATP & R6G	10^{-9} M & 10^{-8} M	**10.** *Appl. Surf. Sci.*, 2017, 403, 29.
PCL	Ag NPs	Embedded	R6G, crystal violet, 4-Mph and melamine	10^{-12} M, 10^{-11} M, 10^{-8} M, 5 ppb	**11.** *RSC Adv.*, 2017, 7, 47373.
PLLA&PAN	Ag NPs	immobilized onto fibers	4-ATP, R6G	10^{-9} M, 10^{-8} M	**12.** *New J. Chem.*,42,2018, 11185.
PAA/PVA	Au NPs & Pd NCs	Embedded	4-ATP	10^{-13} M	**13.** *RSC Adv.*,2018, 8,9344.
PCL	Au NPs	immobilized onto fibers	prostate specific antigen (PSA)	1 pg/mL	**14.** *J Ind. Eng. Chem.*, 2020, 82, 341.

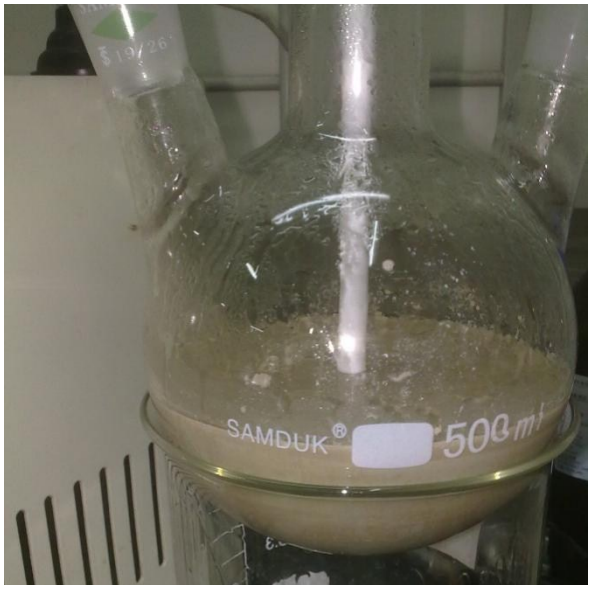

Figure S1. Photograph of the synthesized Ag NWs in flask.

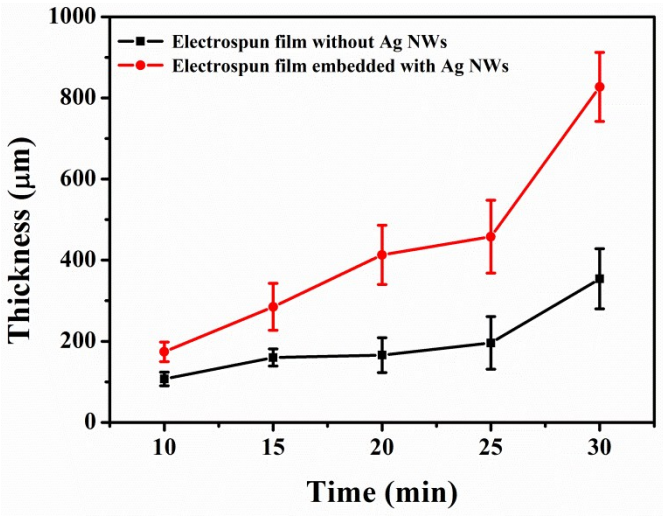

Figure S2. The thickness of electrospun fiber mats as function of electrospinning time

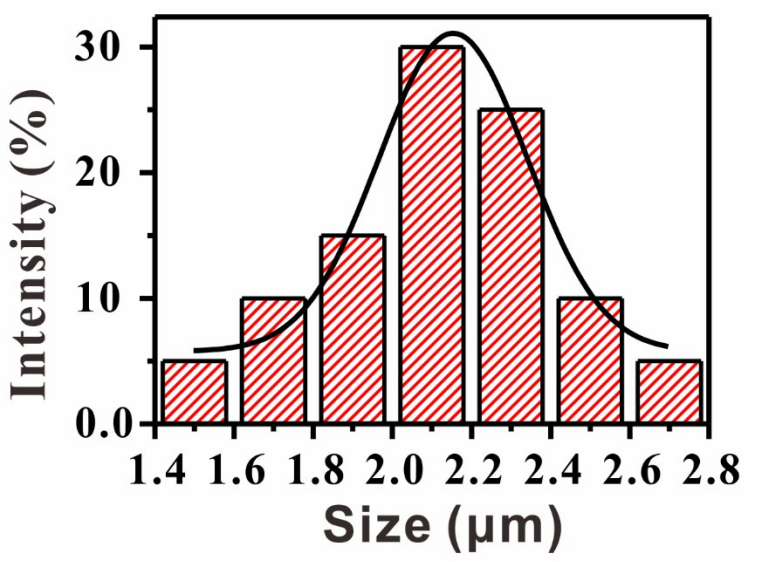

Figure S3. The diameter distribution of electrospun Ag NWs/PS composite fibers.

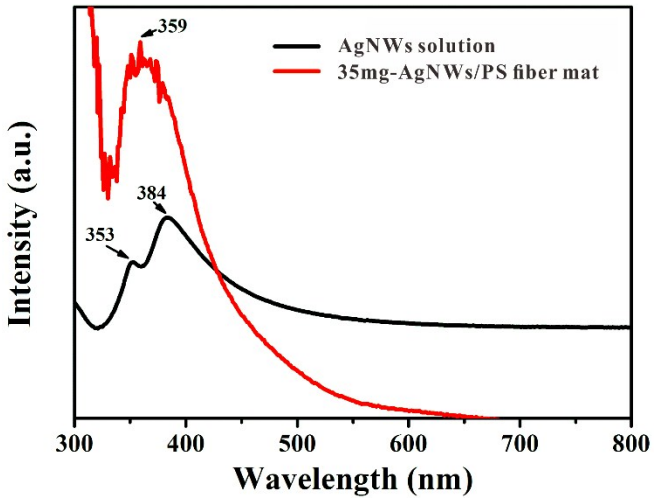

Figure S4. The UV-Vis adsorption spectra of Ag NWs/ethanol solution and Ag NWs/PS composite fiber mat

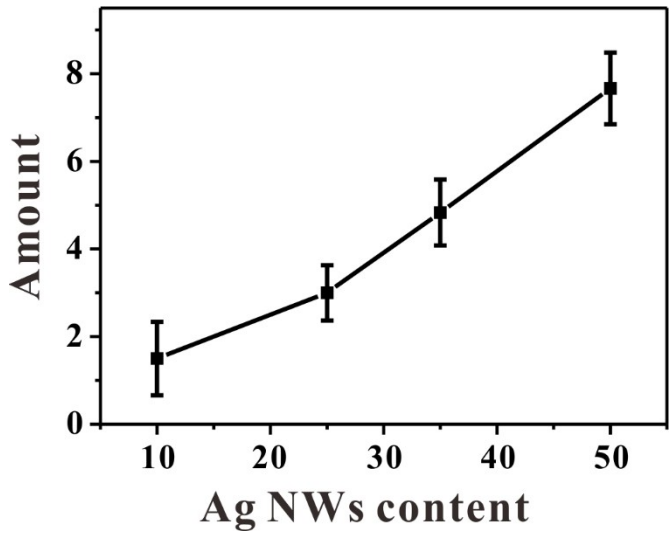

Figure S5. The number of Ag NWs in electrospun fiber as faction of Ag NWs content in electrospun solutions.

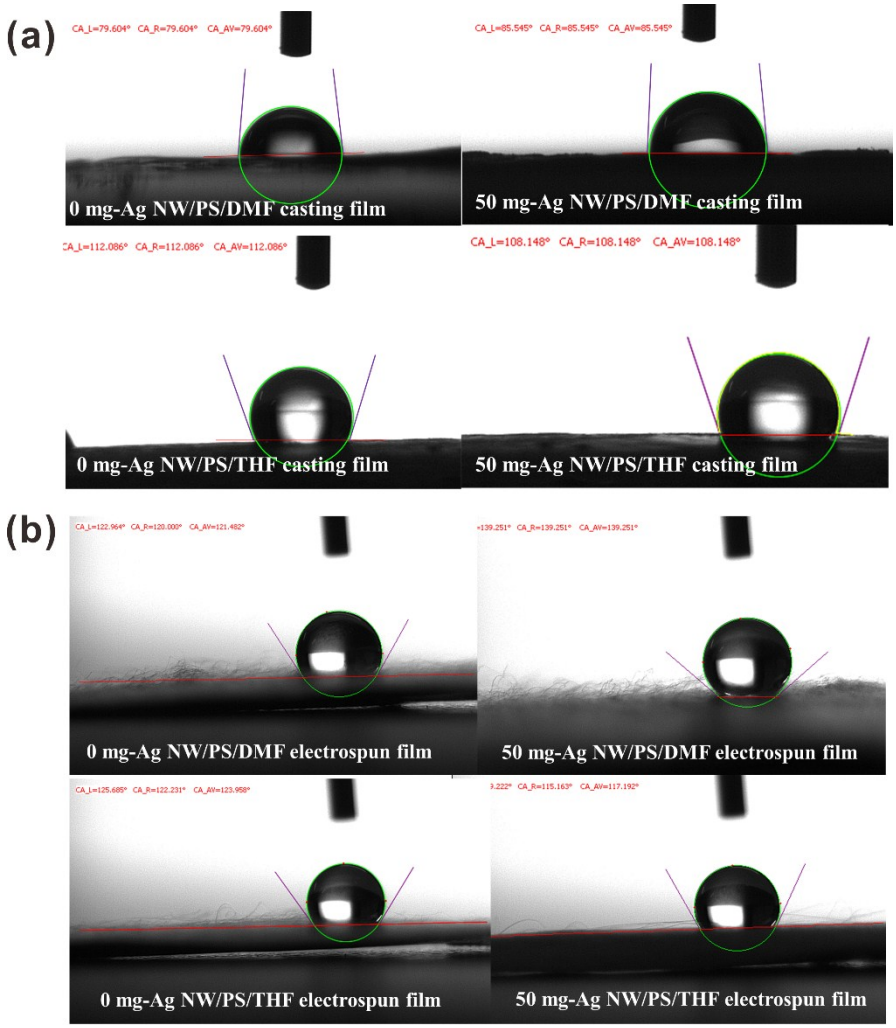

Figure S6. The water contact angle of Ag NWs/PS casting films (a) and electrospun fiber mats (b)

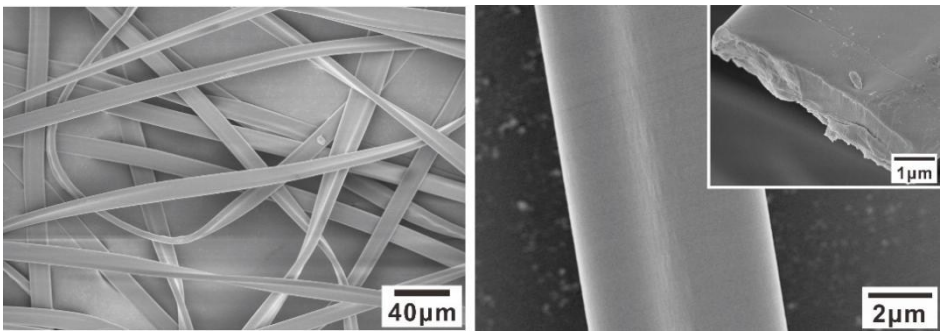

Figure S7. SEM images of obtained Ag NWs/PS composite solid fiber

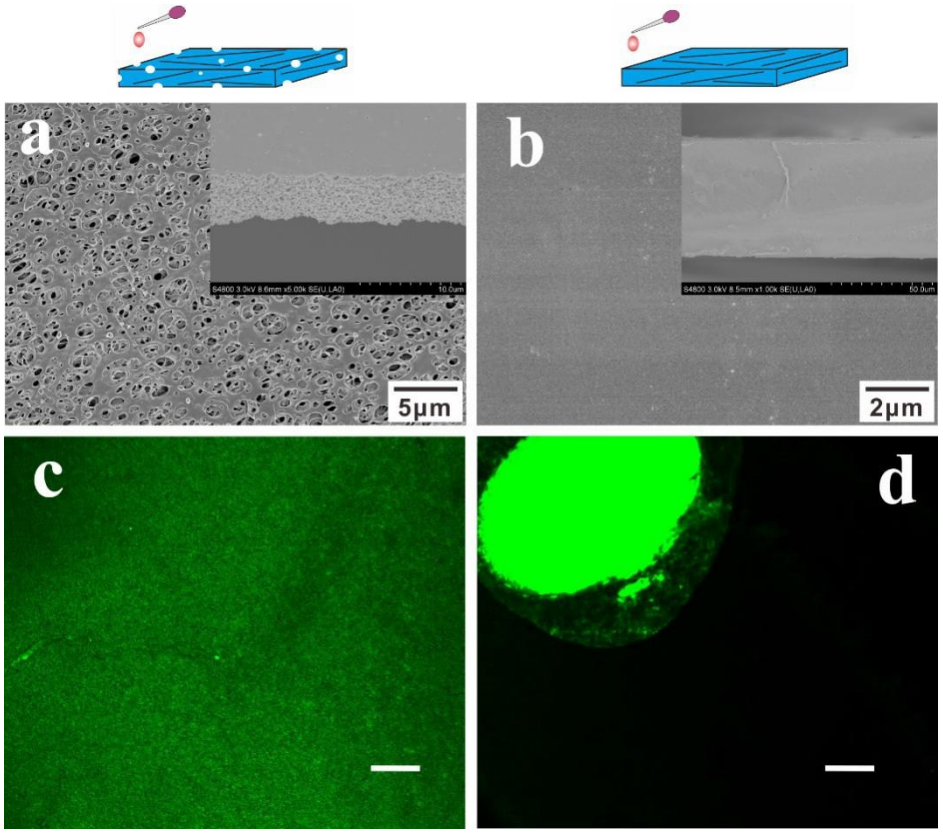

Figure S8. Surface and cross-section SEM images of Ag NWs/PS porous (a) and solid (b) composite films; The fluorescence microscope images of Ag NWs/PS porous (c) and solid (d) composite films after dropping FITC/ethanol solution.

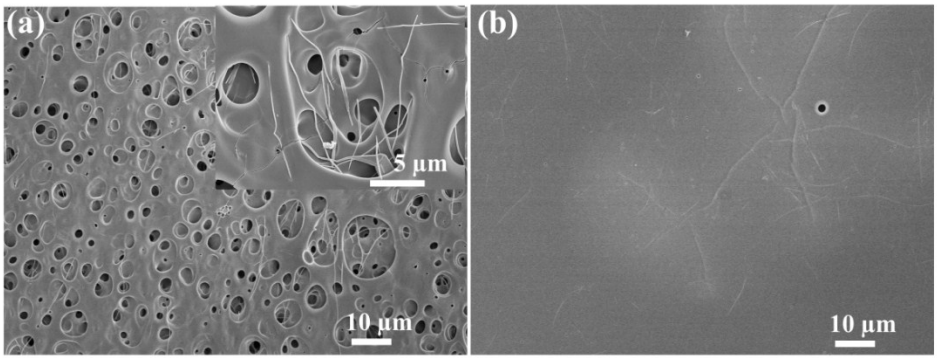

Figure S9. The SEM images of Ag NWs/PS porous film (a) and solid film (b), the content of Ag NWs is 50 mg.

Reference：

1. D. He, B. Hu, Q. -F. Yao, K. Wang, S. -H. Yu, ACS Nano, 2009, 3, 3993.

2. M. Cao, S. Cheng, X. Zhou, Z. Tao, J. Yao, L. -J. Fan, J Polym. Res., 2012, 19, 9810.

3. C. -L. Zhang, K.-P. Lv, H. -P. Cong, S. -H. Yu, small, 2012, 8, 648.

4. C. -L. Zhang, K. -P. Lv, N. -Y. Hu, Le Yu, X. -F. Ren, S. -L. Liu, S. -H. Yu, small, 2012, 8, 2936.

5. C. -L. Zhang, K. -P. Lv, H. -T. Huang, H. -P. Cong, S. -H. Yu, Nanoscale, 2012, 4, 5348.

6. L. Zhang, X. Gong, Y. Bao, Y. Zhao, M. Xi, C. Jiang, H. Fong, Langmuir, 2012, 28, 14433.

7. P. Jia, J. Qu, B. Cao, Y. Liu, C. Luo, J. An, K. Pan, Analyst, 2015, 140, 5190.

8. J. Shao, L. Tong, S. Tang, Z. Guo, H. Zhang, P. Li, H. Wang, C. Du, X. -F. Yu, ACS Appl. Mater. Interfaces, 2015, 7, 5391.

9. K. Jalaja, S. Bhuvaneswari, Ganiga M., R. Divyamol, S. Anup, J. Cyriac, B. K. George, Anal. Methods, 2017, 9, 3998.

10. Z. Liu, Z. Yan, L. Jia, P. Song, L. Mei, L. Bai, Y. Liu, Appl. Surf. Sci., 2017, 403, 29.

11. J. Shi, T. You, Y. Gao, X. Liang, C. Li, P. Yin, RSC Adv., 2017, 7, 47373.25

12. Z. Liu, Z. Yana, L. Bai, New J. Chem.,2018, 42, 11185.

13. Z. Liu, Z. Yana, L. Bai, RSC Adv., 2018, 8, 9344.

14. B. J. Yun, W. -G. Koh, J Ind. Eng. Chem., 2020, 82, 341.