## **Electronic Supplementary Information**

## Screening of Silver Nanoparticle in Antibacterial Products by Leveraging Silver Nanowires Membrane as a Filter and Amplifier

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Fig. S1 TEM images, UV-vis absorption spectra, and standard curves of (a-c) SC-AgNPs, (d-f) HH-AgNPs, and (g-i) PVP@AgNPs.



Fig. S2 (a) UV-vis absorption spectrum and (b) SEM image of AgNWs.



Fig. S3 SERS spectra of SC-AgNPs with 4-MBA ( $10^{-6}$  M).  $10^{-2}$  mg/mL of SC-AgNP

solution was used as the analyte.



Fig. S4 SERS spectra of SC-AgNPs in the tap water (a) and pond water (b) with different spiked concentrations.



**Fig. S5** (a) UV-vis spectra of four commercial antibacterial products. (b) UV-vis spectra of SC-AgNPs with the same concentration of antibacterial hydrogel and disinfectant spray determined by ICP-MS. To ensure the absorbance in a linear range, the SC-AgNP solution with the same concentration of antibacterial hydrogel was tested after dilution 100 times, and the SC-AgNP solution with the same concentration as the disinfectant spray was tested after being diluted 10 times.



Fig. S6 TEM images of (a) antibacterial hydrogel, (b) disinfectant spray, (c) nasal spray, and (d) mite removal spray.

Table S1 Concentrations	of AgNPs synthesize	d by different methods.
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Lable	Concentration (mg/mL)	
SC-AgNPs	$9.39  imes 10^{-2}$	
HH-AgNPs	$8.64 \times 10^{-2}$	
PVP@AgNPs	$1.58  imes 10^{-1}$	