Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B

Supplementary Information

Single-walled carbon nanotubes coated antibacterial paper: Preparation and mechanistic study

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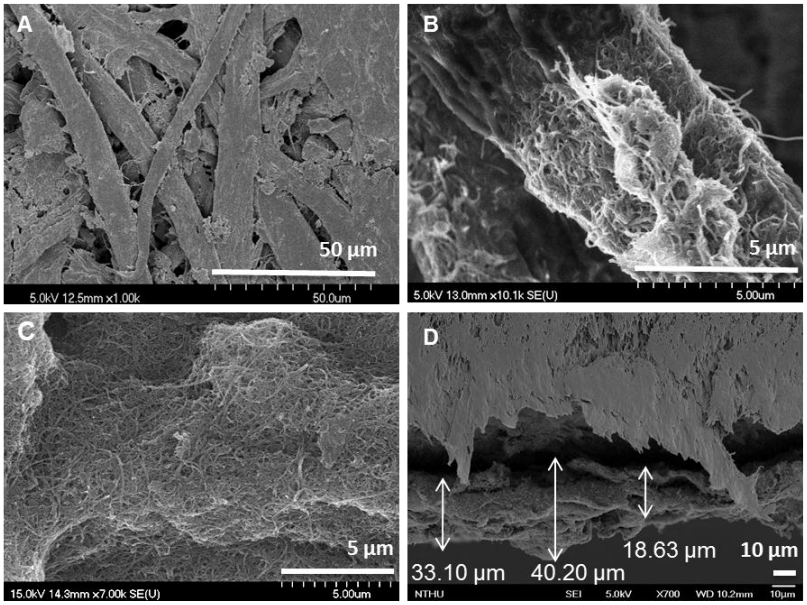

Fig. S1 SEM images of (A) UP, SP with (B) 10 min, and (C) 20 min sonication, and (D) cross-sectional view of SP with 10 min sonication.

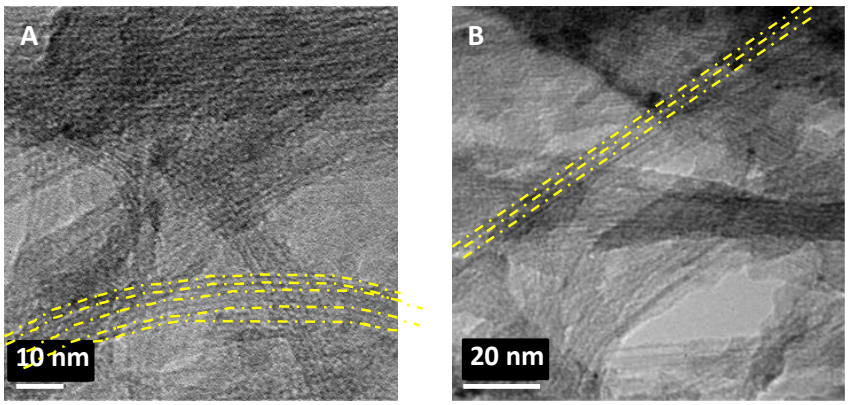

Fig. S2 TEM images (A, B) of AFSWCNTs.

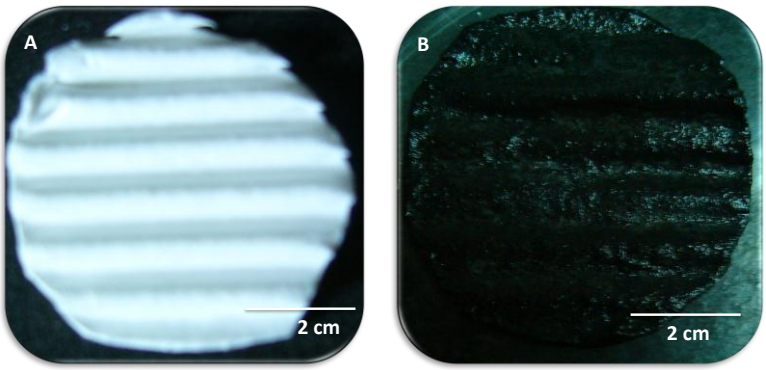

Fig. S3 Optical images of (A) UP and (B) SP with 20 min of sonication

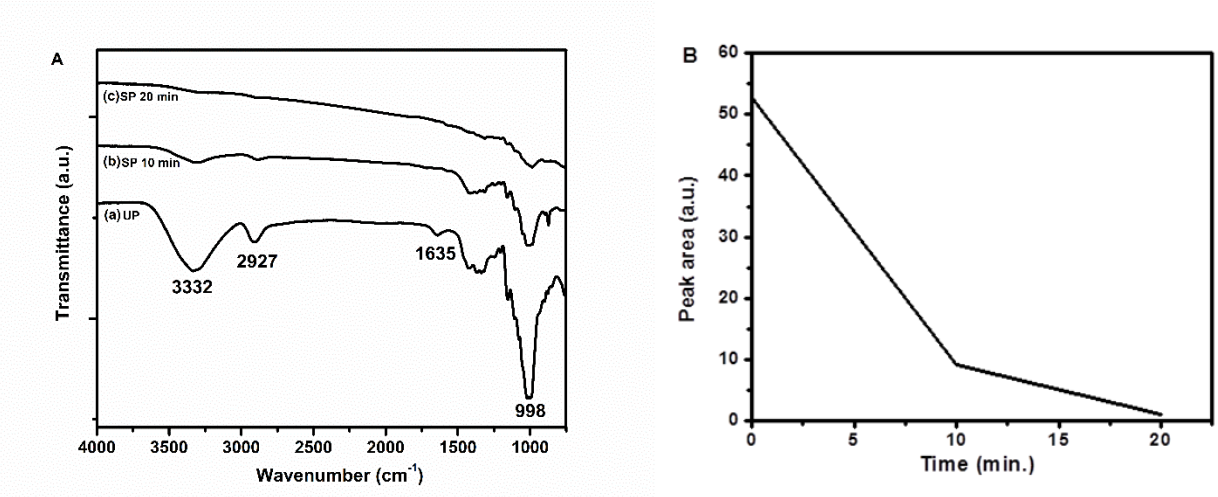

Fig. S4 ATR-FTIR spectra of (A) UP and SP with different sonication time, (B) Peak area of 3100 - 3700 cm^{-1} broad band as a function of sonication time.

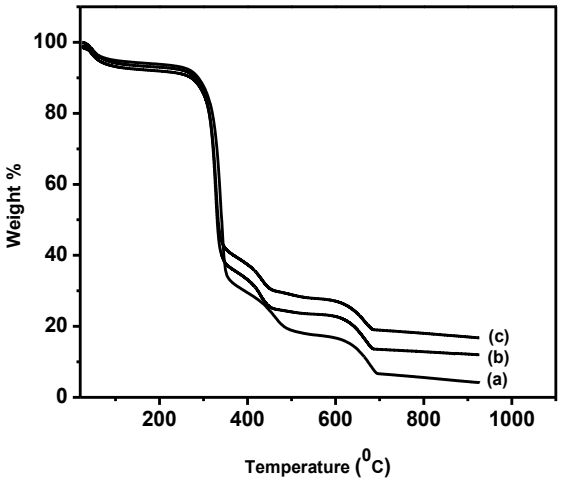

Fig. S5 TGA thermograms of (a) UP, SP with (b) 10 min and (c) 20 min sonication.

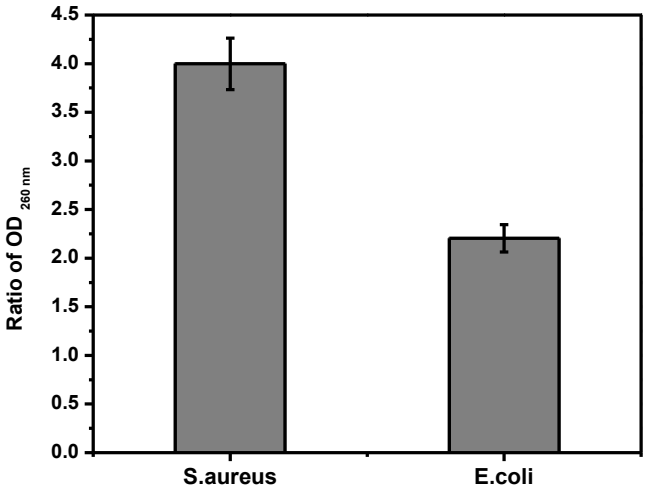

Fig. S6 Ratio of OD_{260} in SP *Vs* UP bacterial suspension after 1 h interaction.

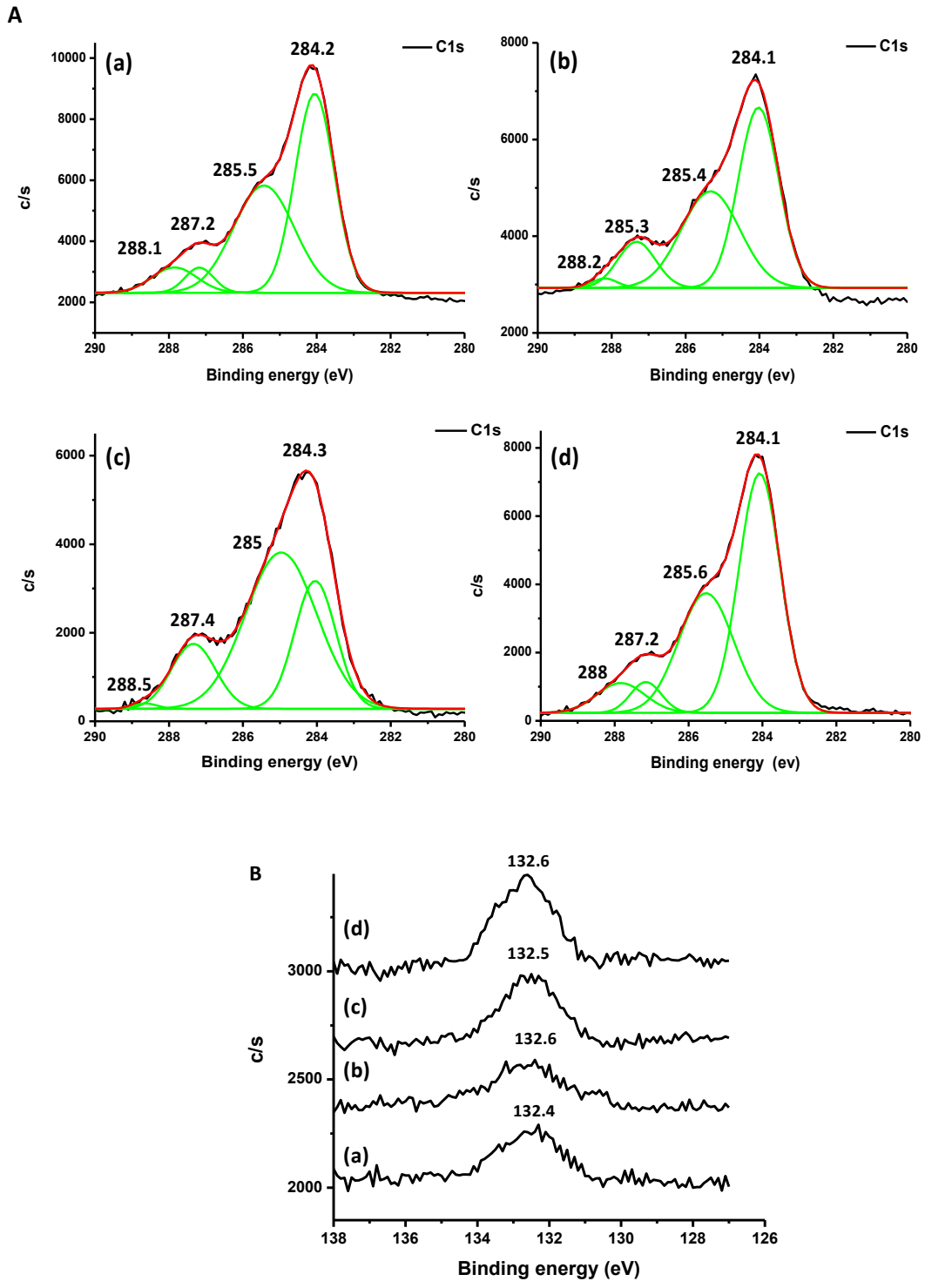

Fig. S7 (A) C1s XPS spectra of freeze-dried *S. aureus* and *E. coli* for control group (a, c) and experimental group (b, d), respectively. (B) P2p spectral line of *S. aureus* and *E. coli* for control (a, c) and experimental group (b, d), respectively.

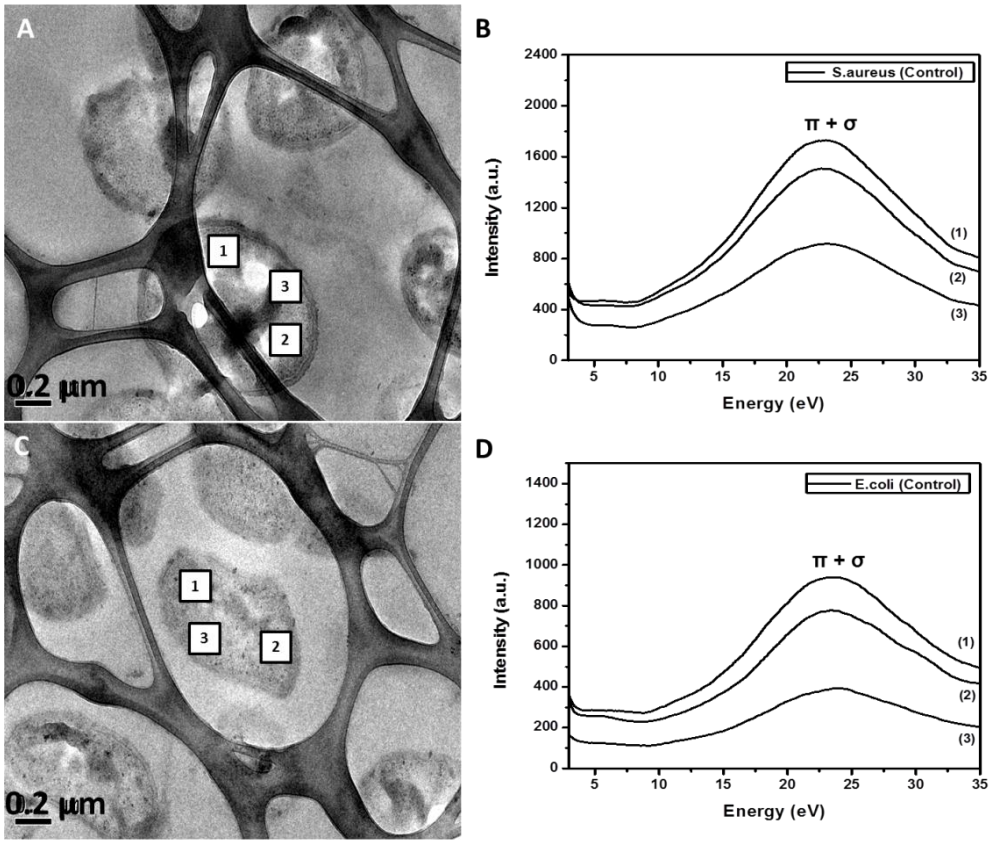

Fig. S8 HAADF-STEM images of (A) *S. aureus* and (C) *E. coli* thin sections. The numbers in (A) and (C) indicates the area analyzed by EELS. Characteristic peak at ~23 eV in (B) and (D) EELS spectra corresponds to π +σ plasmon contributed by carbon-rich organelles in *S. aureus* and *E. coli* bacteria, respectively.

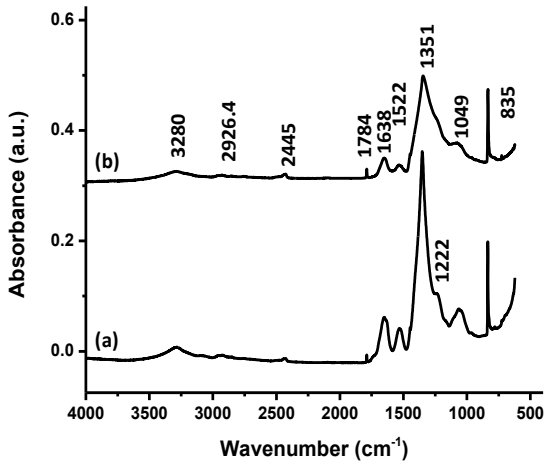

Fig. S9 ATR-FTIR spectra of freeze-dried (a) *S. aureus* and (b) *E. coli* bacteria.

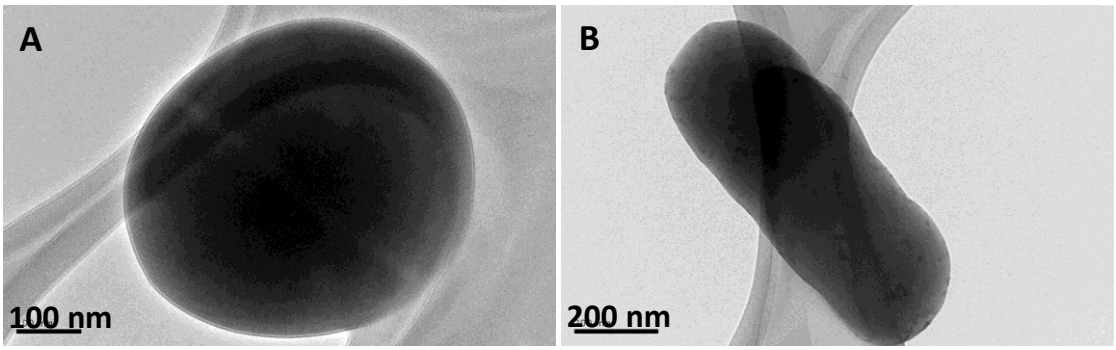

Fig. S10 TEM images of intact (A) gram-positive *S. aureus* and (B) gram-negative *E. coli* bacteria.

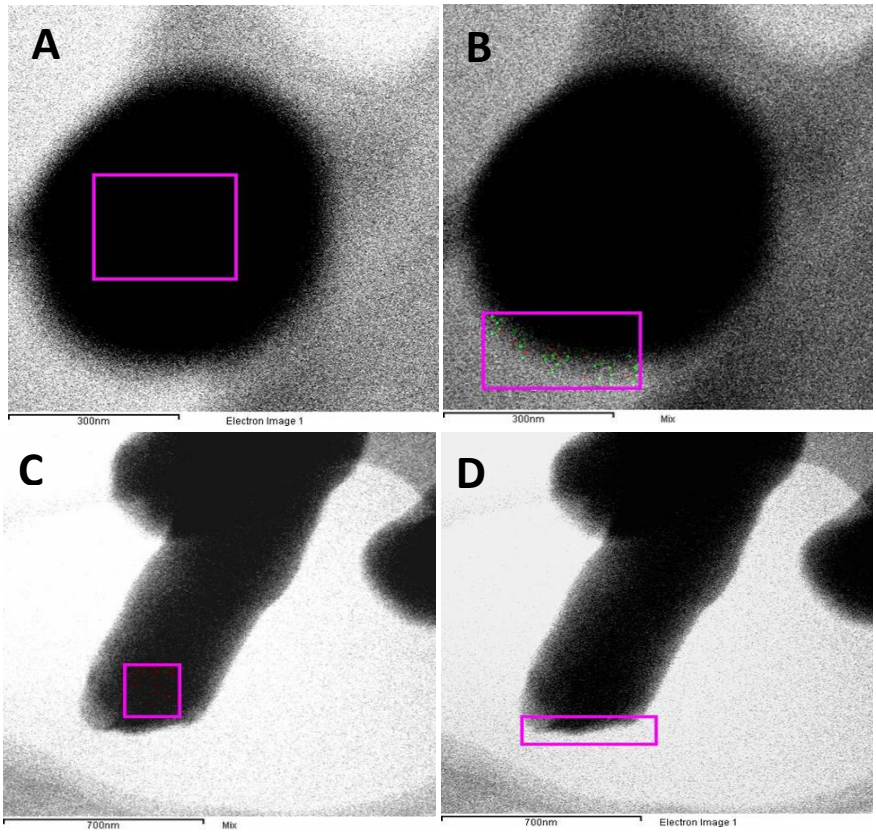

Fig. S11 HAADAF-STEM images of intact gram-positive *S. aureus* (A, B) and gram-negative *E. coli* (C, D) bacteria. Selected areas (highlighted with pink boxes) were investigated with EDAX to estimate the ratio of C and P elements at interior to the cell wall for both strains.

Table S1 Ratio of C and P elements at interior to the cell wall for both gram-positive *S. aureus* (A, B) and gram-negative *E. coli* (C, D) bacteria.

Bacteria	Element	Ratio of C and P at interior to cell wall of bacteria
S. aureus	P_{IN}:P_{CW} (A:B)	1 : 3.7
E. coli	P_{IN}:P_{CW} (C:D)	1 : 5
S. aureus	C_{IN}:C_{cw} (A:B)	1 : 1.02
E. coli	C_{IN}:C_{cw} (C:D)	1 : 1.14

Table S2 Antibacterial contribution by gram-positive *S. aureus* and gram-negative *E. coli*.

Survival Rate (%)			Normalized survival rate* (%)	Antibacterial efficacy *(%)
	SP	UP		
S. aureus	12	88	14	86
E. coli	46	94	48	52

* The viable bacteria were monitored by counting the number of colony-forming units (CFU); N= Survival rate of SP; N_o= Survival rate of UP; Normalized survival rate= N/N_o x 100% ; Antibacterial efficacy = 100% − Normalized survival rate.