

Supporting Information

Emerging Investigator Series: Enhanced peroxidase-like activity and improved antibacterial performance of palladium nanosheet by alginate-corona

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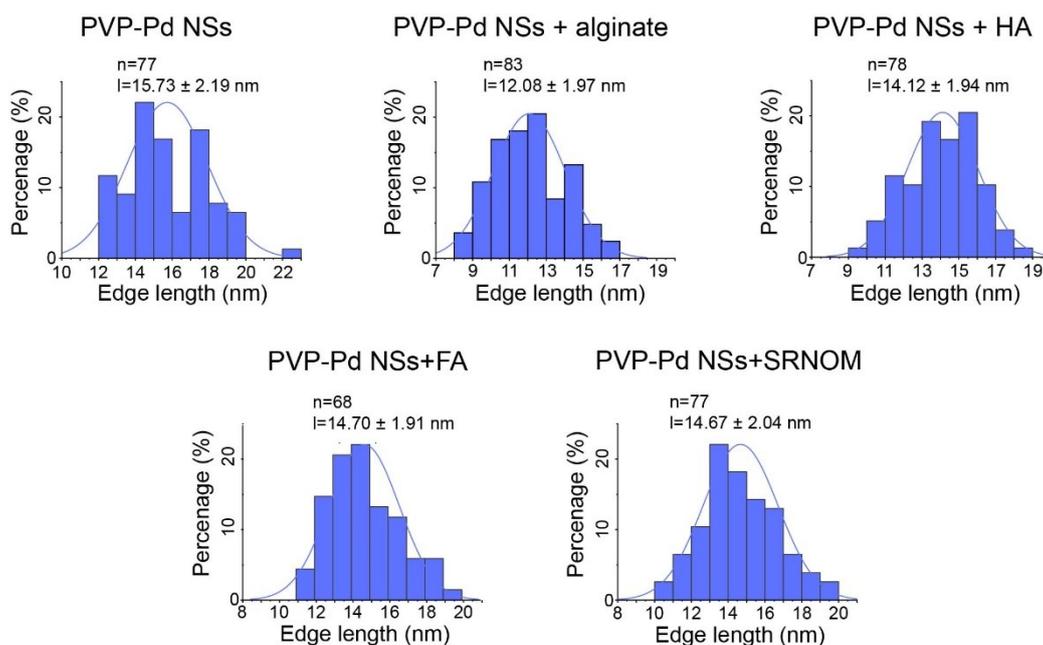


Figure S1. The histogram of edge length distribution of pristine and corona-coated Pd NSs based on TEM analysis.

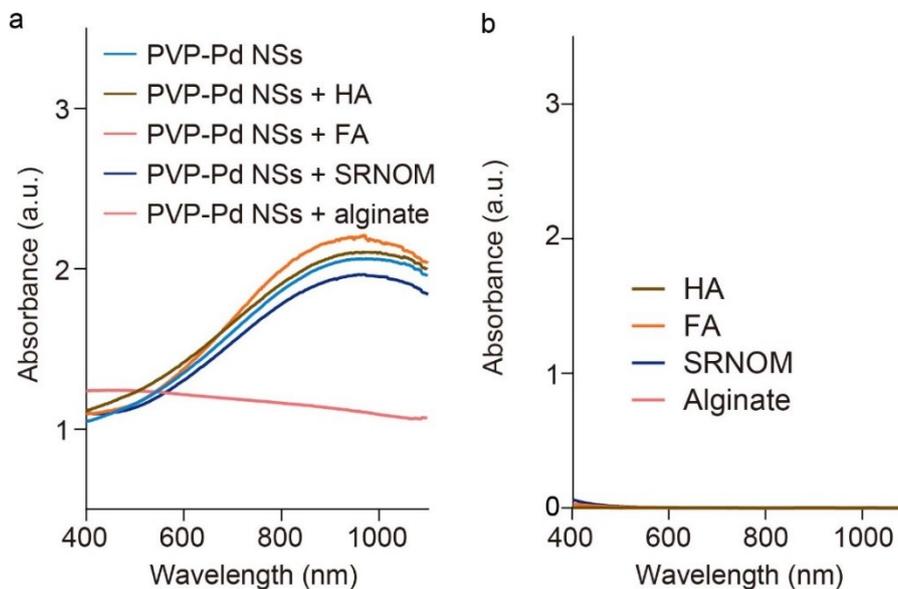


Figure S2. UV-Vis spectra of (a) pristine and corona-coated Pd NSs and (b) four ecological substances (HA, FA, SRNOM and alginate) in deionized water.

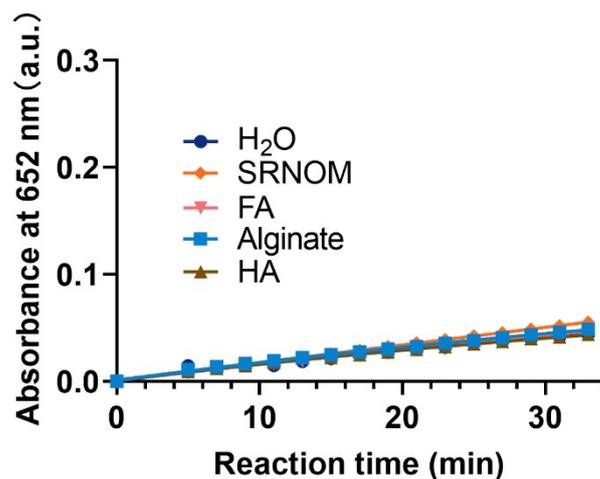


Figure S3. Time-dependent absorbance change at 652 nm of alginate, HA, FA and SRNOM ($1 \mu\text{g mL}^{-1}$) in the presence of TMB (0.83 mM) and H_2O_2 (4 mM).

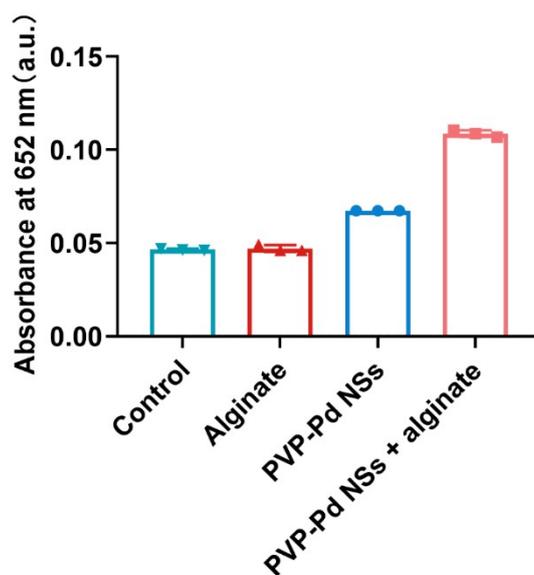


Figure S4. Oxidase-like activity of pristine and corona-coated Pd NSs. Absorbance at 652 nm of TMB (0.83 mM) without or with the treatments of alginate, pristine and alginate-coronated Pd NSs at $1 \mu\text{g mL}^{-1}$ after 10 min, respectively ($n = 3$ independent experiments).

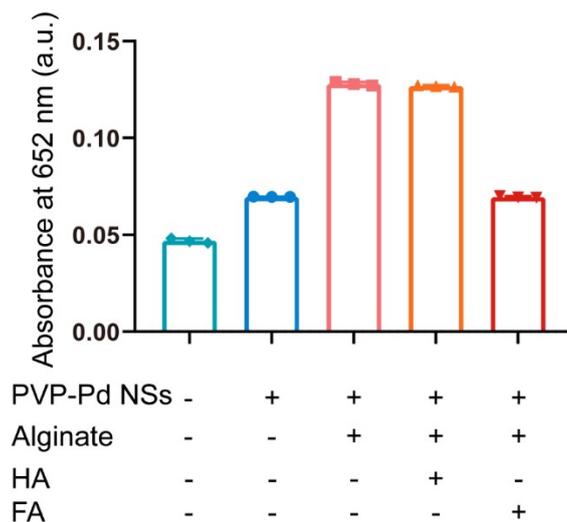


Figure S5. Peroxidase-like activity of Pd NSs in presence of ecological substances. Absorbance at 652 nm of mixture containing TMB and H_2O_2 without or with pristine Pd NSs ($40 \mu\text{g mL}^{-1}$) in presence of alginate, alginate+HA and alginate+FA ($40 \mu\text{g mL}^{-1}$) at 37°C for 24 h, respectively ($n = 3$ independent experiments).

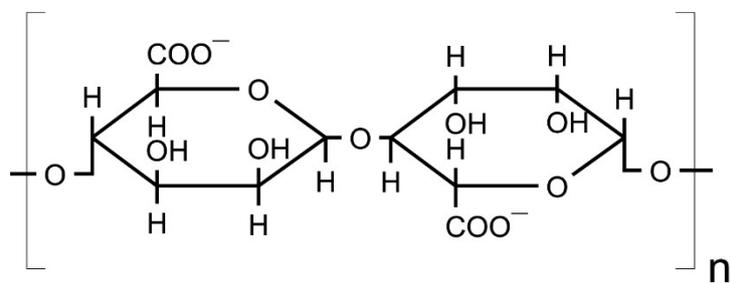


Figure S6. Chemical structure of the alginate molecule.

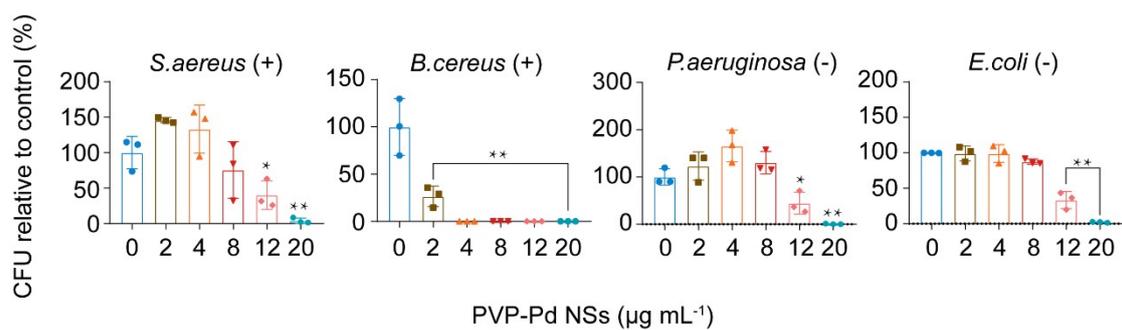


Figure S7. Normalized CFU counts obtained from Figure 4a for Gram-positive (*S. aureus*, *B. cereus*) and Gram-negative (*E. coli*, *P. aeruginosa*) bacteria treated without or with pristine Pd NSs at 2, 4, 8, 12 and 20 µg mL⁻¹ for 2 h (n = 3 independent experiments). Control group was regarded as 100%. * P < 0.05, ** P < 0.01.

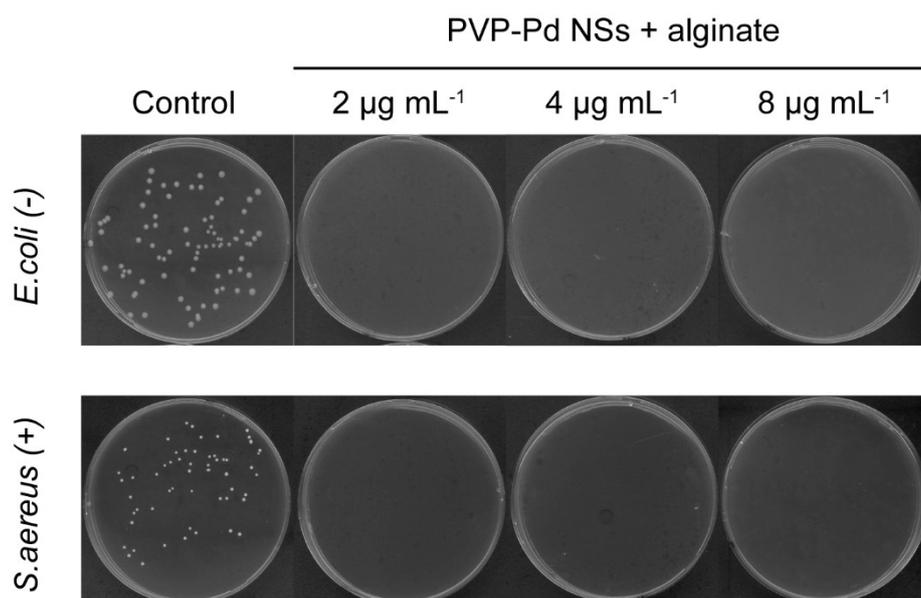


Figure S8. Representative images of bacterial colonies formed by *E. coli* and *S. aureus* treated without or with alginate-crowned Pd NSs at 2, 4 and 8 µg mL⁻¹ for 2 h.

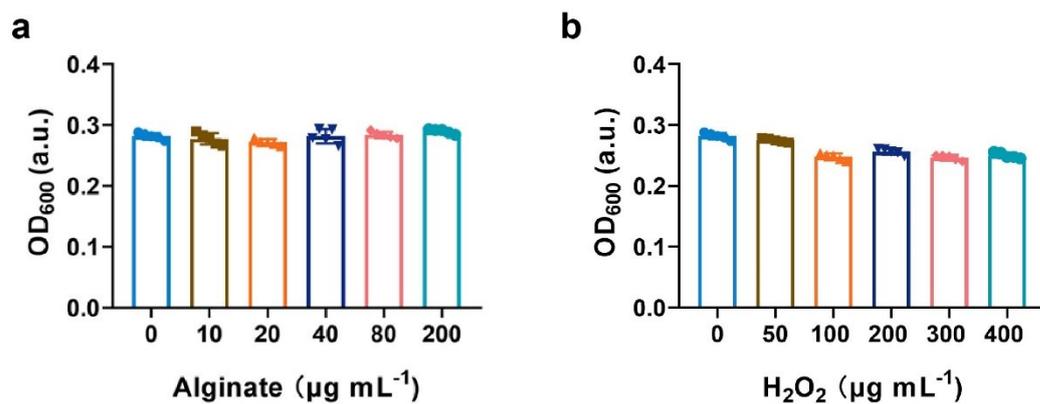


Figure S9. Growth inhibition of *E. coli* by (a) alginate and (b) H₂O₂ after 2 h treatments assessed by OD₆₀₀ method (n = 5 independent experiments).

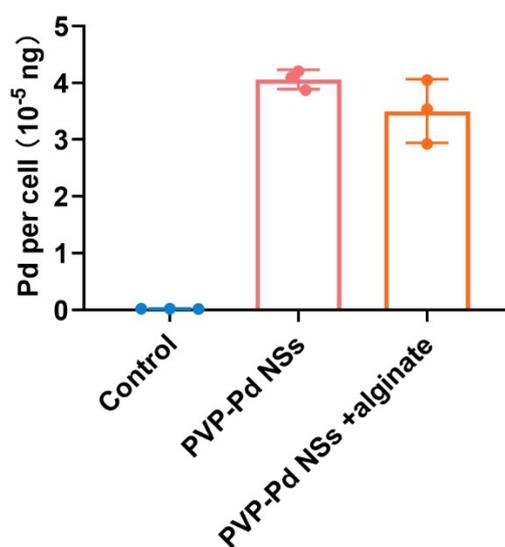


Figure S10. Cellular Pd levels of *E. coli* treated without or with pristine and alginate-coronated Pd NSs at 4 µg mL⁻¹ for 2 h analyzed by ICP-MS (n = 3 independent experiments).

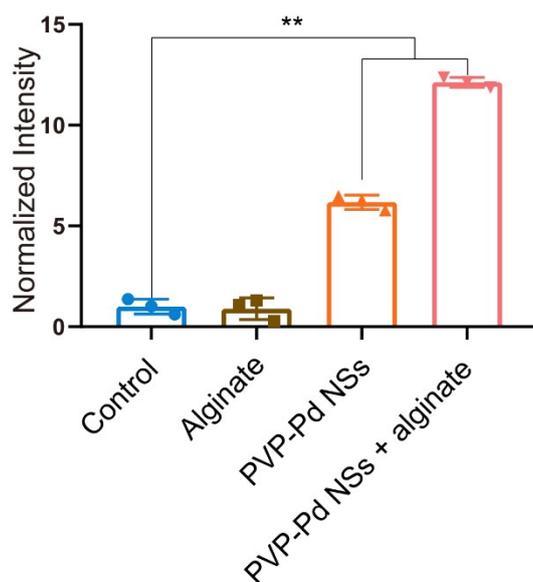


Figure S11. ROS generation in *S.aureus* cells without or with the treatments of alginate, pristine and alginate-coronated Pd NSs at $4 \mu\text{g mL}^{-1}$ for 2 h, respectively (n = 3 independent experiments).

Table S1. Michaelis-Menten constants of pristine and corona-coated Pd NSs.

Corona	K_m (μM)	V_{max} ($\mu\text{M s}^{-1}$)	k_{cat} (s^{-1})
—	327.6	3.49	3566.3
alginate	220.6	4.47	4557.1
HA	238.2	3.12	3183.7
FA	776.3	3.94	4019.4
SRNOM	758.4	4.21	4293.9