Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Toxic assessment and mechanistic investigation of engineered monoclinic VO_2 nanoparticles

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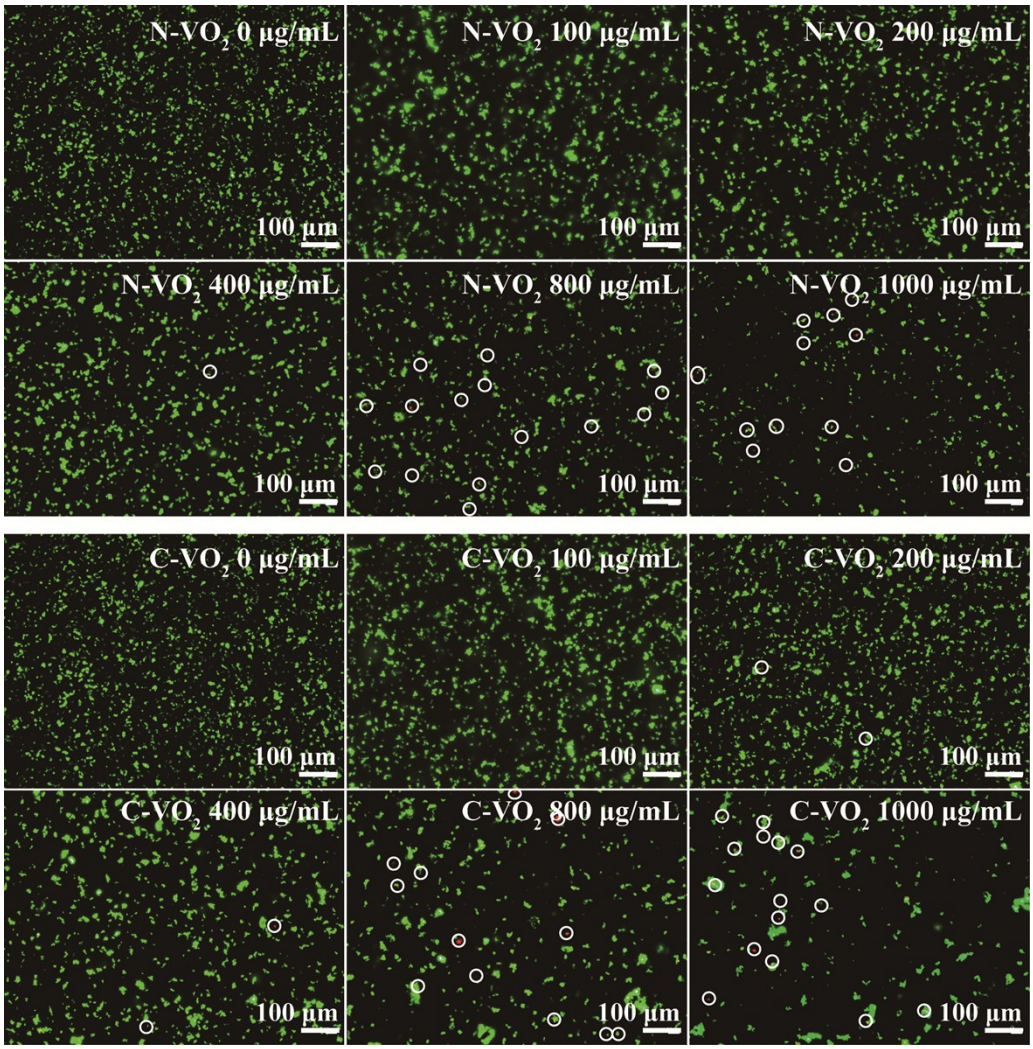

Figure S1. Photos of live or dead *S. aureus* that had been treated with N-VO_2 and C-VO_2 for 12 h. Bacteria were stained with SYTO9 and PI. Green color represents live cells with intact membrane, whereas red color represents the disrupted cells, which are marked with white circles.

Table S1. Physicochemical properties of VO_2 particles (10 μg/mL).

	Water		LB media	
	Zeta potential (mV, DLS)	Diameter (nm, NTA)	Zeta potential (mV, DLS)	Diameter (nm, NTA)
N-VO_2	-27.0	94 ± 33	-7.48	217 ± 148
C-VO_2	-22.1	132 ± 54	-7.66	187 ± 104
M-VO_2	-37.8	/	-6.63	/
C-VO_2 (grinding)	-28.3	141 ± 65	-8.33	197 ± 79

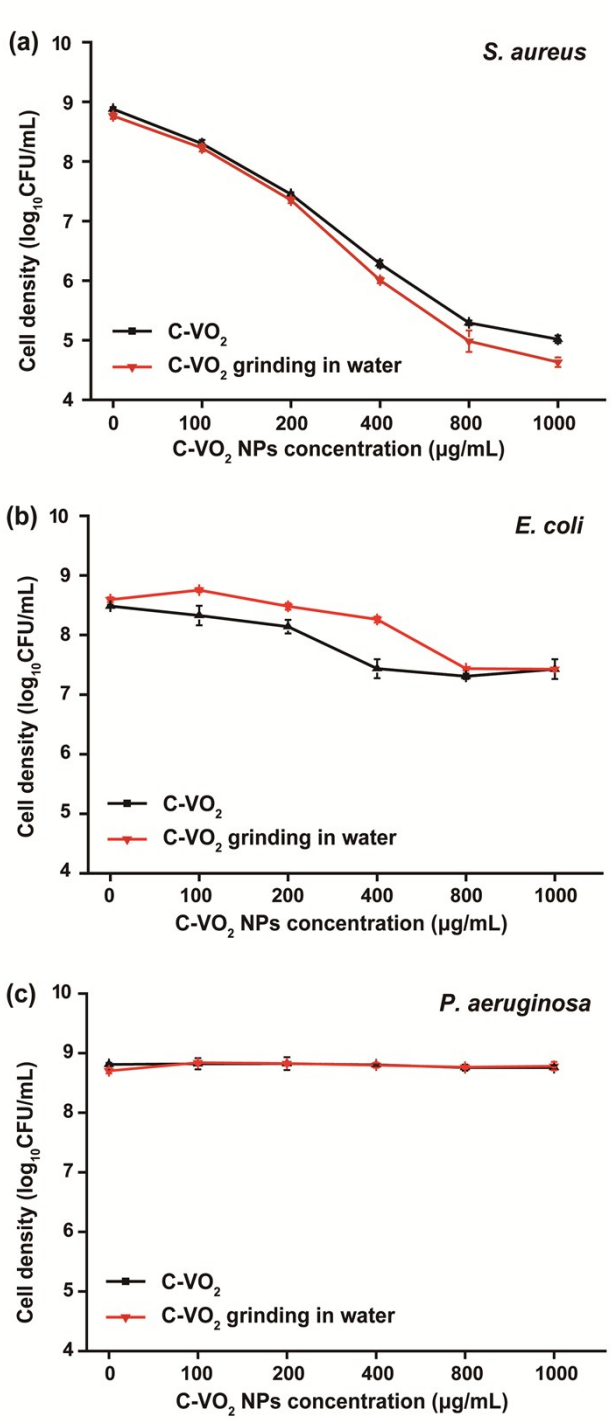

Figure S2. Antibacterial effects of VO_2 particles against *S. aureus* (a), *E. coli* (b), and *P. aeruginosa* (c). All experiments were performed in triplicate.

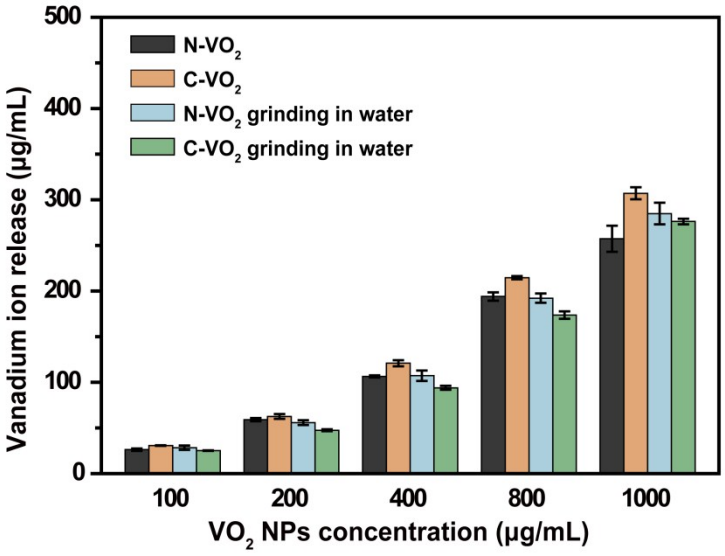

Figure S3. Dissolution of VO_2 prepared by grinding in water with different methods in LB media for 12 h incubation. All experiments were performed in triplicate.

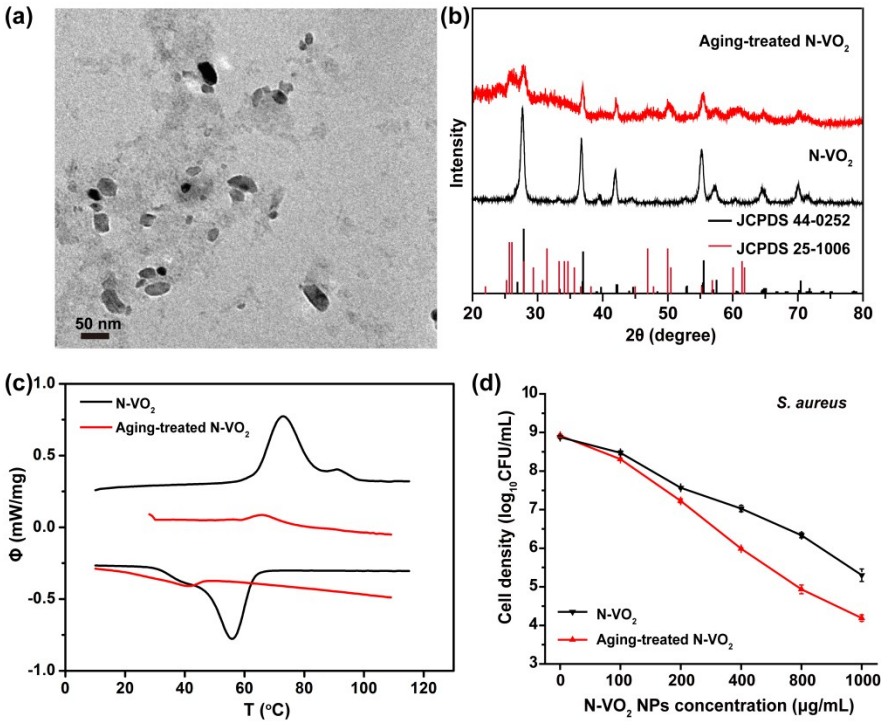

Figure S4. Characterization of aging-treated VO_2 nanoparticles. (a) TEM image of aging-treated N-VO_2 particles. (b) XRD patterns of N-VO_2 particles before and after aging treatment. (c) DSC thermal spectra of N-VO_2 particles before and after aging treatment. (d) Antibacterial activity of N-VO_2 particles against *S. aureus*. This experiment was performed in triplicate.

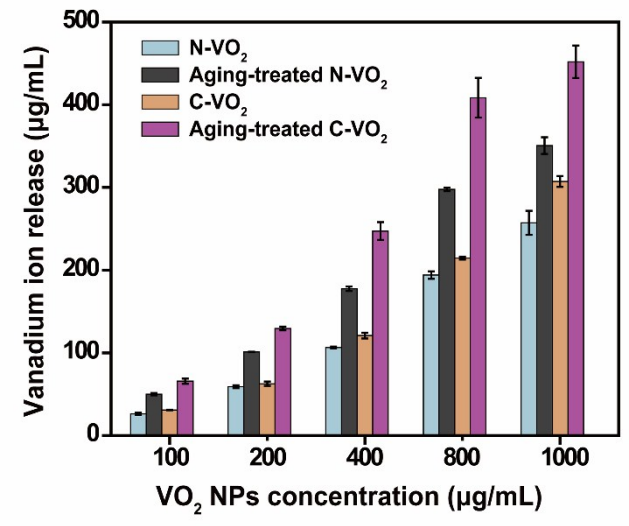

Figure S5. The effect of aging treatment on the dissolution of VO_2 in LB media after 12 h. All experiments were performed in triplicate.

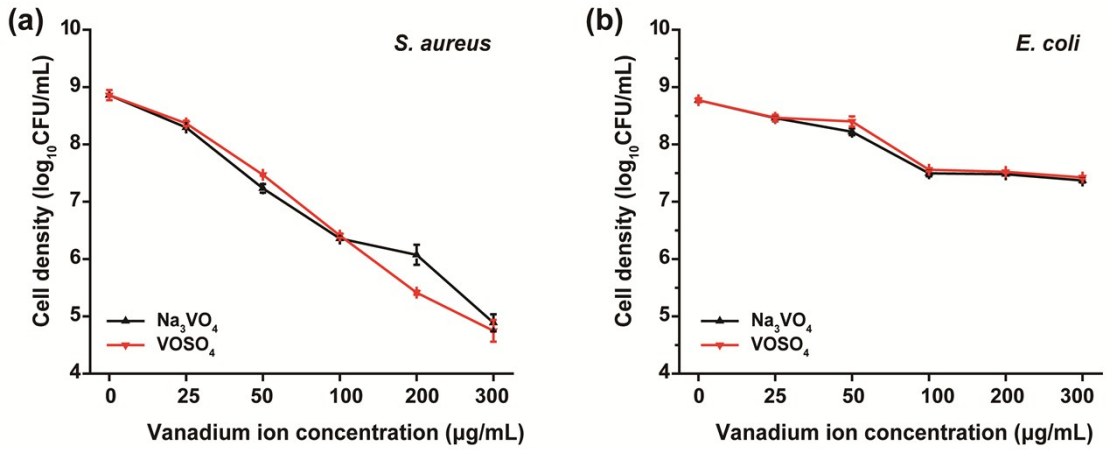

Figure S6. Antibacterial activity of two vanadium ions against *E.coli* (a) and *S. aureus* (b). All experiments were performed in triplicate.

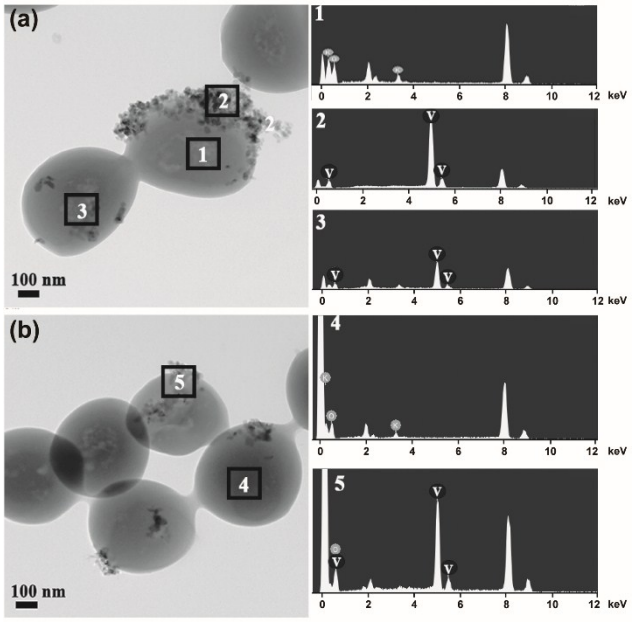

Figure S7. HRTEM-EDS analysis of *S. aureus* after treated with N-VO_2 NPs (a) and C-VO_2 NPs (b).

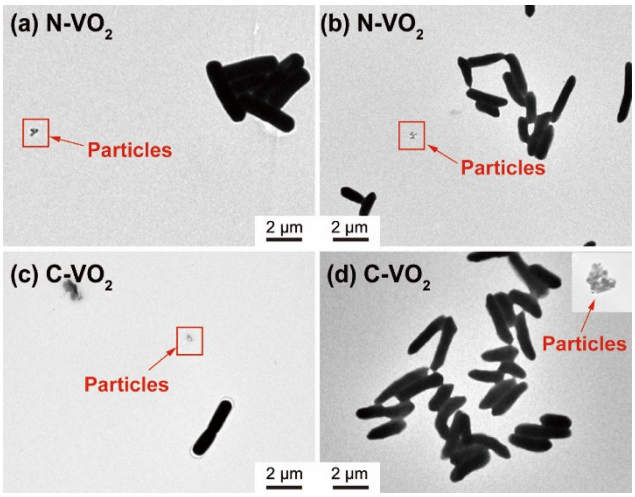

Figure S8. TEM images of *B. subtilis* (a, c) and *P. aeruginosa* (b, d) after treatment with N-VO_2 (a, b) and C-VO_2 (c, d) at the concentration of 400 μg/mL.