

Dual mode antibacterial surfaces based on Prussian Blue and silver nanoparticles

Supplementary Material

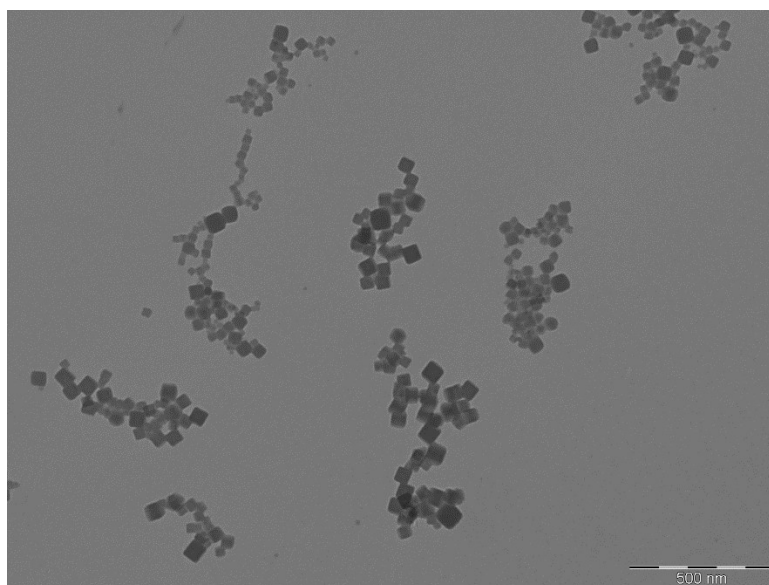
S1 – TEM imaging of PBNP

S2 – Alternative functionalization routes

S3- Microbicidal effect raw data

S4- Photothermal microbicidal effect raw data

S1 – TEM imaging of PBNP

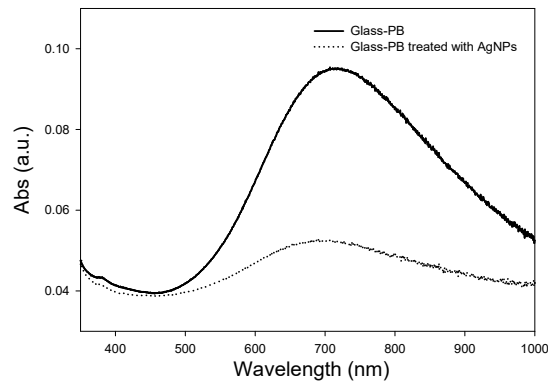


TEM images were taken on JEM-1200 EX II 140, on parlodion-coated nickel grids, after drying a dropping of 10 microliters of solution of Pb nps diluted ten times with bi-distilled water.

S2 – Alternative functionalization routes

S2.1 SAM of PBNP successively treated with a AgNP colloid

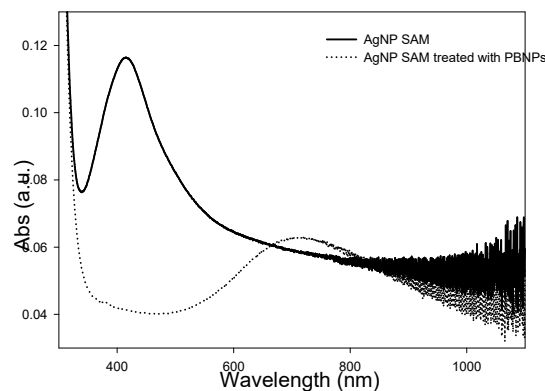
In this preparation, a Glass-PB sample as described in the main text was immersed in a AgNP colloid (see Experimental for details) for 15 min at room temperature. Glasses were then rinsed with bidistilled water and blow dried with nitrogen.



As the UV-Vis spectra clearly show, the PB band is almost disappeared after the treatment with AgNPs and no plasmon band from the AgNPs is present.

S2.2 SAM of PBNP successively treated with a AgNP colloid

We also tried to prepare a AgNP monolayer and then treat it with PBNPs in a second step (*i.e.* the same preparation of the previous paragraph, but inverting the order of the nanoparticles deposition).



AgNP monolayer was grafted on a PEI-silane SAM following a published procedure (see reference 20 in the main text). Ag functionalized samples were then immersed in a PBNP colloid for 18 hours at room temperature and rinsed with bidistilled water. The samples were finally blow dried with nitrogen. As the UV-Vis spectra clearly show, the LSPR band of the AgNPs is completely absent after the immersion in PBNPs. Only a weak band of Prussian Blue is present in the final spectrum.

S3- Microbicidal effect raw data

Microbicidal effects were expressed in logarithmic units in the main text. Raw data are reported here for the photothermal effects.

1 *E. coli* ATCC 10536

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>E.coli</i> V3	5	1	100.000

1 *S. aureus* ATCC: 6528

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>S.aureus</i> V1	5	2'900	98.739

<i>E. coli</i> check	5	3'435'000	
<i>E. coli</i> V4	24	1	100.000
<i>E.coli</i> check	24	1'335'000	

<i>S.aureus</i> check	5	230'000	
<i>S.aureus</i> V2	24	1	99.999
<i>S.aureus</i> check	24	84'500	

2 *E. coli* ATCC 10536

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>E.coli</i> (V3)	5	1	100.000
<i>E. coli</i> check	5	52'350'000	
<i>E. coli</i> (V4)	24	1	100.000
<i>E.coli</i> controllo	24	21'100'000	

2 *S. aureus* ATCC 6528

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>S.aureus</i> (V1)	5	500'000	66.667
<i>S.aureus</i> check	5	1'500'000	
<i>S.aureus</i> (V2)	24	46'000	95.400
<i>S.aureus</i> check	24	1'000'000	

3 *E. coli* ATCC 10536

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>E.coli</i> (V3)	5	1	100.000
<i>E. coli</i> check	5	52'000'000	
<i>E. coli</i> (V4)	24	1	100.000
<i>E.coli</i> check	24	106'100'000	

3 *S. aureus* ATCC 6528

Glass-PB/Ag	ore	cfu/1ml	% of dead bacteria
<i>S.aureus</i> (V1)	5	11'000	98.485
<i>S.aureus</i> check	5	726'000	
<i>S.aureus</i> (V2)	24	3'000	98.684
<i>S.aureus</i> check	24	228'000	

S4- Photothermal microbicidal effect raw data

Microbicidal effects were expressed in logarithmic units in the main text. Raw data are reported here for the photothermal effects.

1 *E.coli* ATCC: 10536

	min	cfu/1ml	% of dead bacteria
<i>E. Coli</i> 1	30'	1	100.000
<i>E. Coli</i> 4	30'	8'700'000	
<i>E.Coli</i> 2	30'	9'100'000	-4.598
<i>E. Coli</i> 4	30'	8'700'000	
<i>E. Coli</i> 3	30'	300000	96.552
<i>E.Coli</i> 4	30'	8'700'000	

1 *S.aureus* ATCC: 6528

	min	cfu/1ml	% of dead bacteria
<i>S.aureus</i> 1	30'	2'000'000	98.708
<i>S.aureus</i> 4	30'	154'800'000	
<i>S.aureus</i> 2	30'	310'000'000	-100.258
<i>S.aureus</i> 4	30'	154'800'000	
<i>S.aureus</i> 3	30'	7'000'000	95.478
<i>S. aureus</i> 4	30'	154'800'000	

E. coli ATCC: 10536

	min	cfu/1ml	% of dead bacteria
<i>E.coli</i> 1	30'	35'500	99.966
<i>E.coli</i> 4	30'	103'000'000	
<i>E.coli</i> 2	30'	127'000'000	-23.301
<i>E.coli</i> 4	30'	103'000'000	
<i>E. Coli</i> 3	30'	588'900	99.428
<i>E.Coli</i> 4	30'	103'000'000	

2 *S. aureus* ATCC: 6528

	min	cfu/1ml	% of dead bacteria
<i>S.aureus</i> 1	30'	3'075'000	95.662
<i>S.aureus</i> 4	30'	70'893'300	
<i>S.aureus</i> 2	30'	70'360'000	0.752
<i>S.aureus</i> 4	30'	70'893'300	
<i>S.aureus</i> 3	30'	47'280'000	33.308
<i>S.aureus</i> 4	30'	70'893'300	

E. coli ATCC: 10536

	min	cfu/1ml	% of dead bacteria
<i>E.coli</i> 1	30'	17'700	99.977
<i>E.coli</i> 4	30'	75'500'000	
<i>E.coli</i> 2	30'	57'000'000	24.000
<i>E.coli</i> 4	30'	75'000'000	

3 *S. aureus* ATCC: 6528

	min	cfu/1ml	% of dead bacteria
<i>S.aureus</i> 1	30'	140'000	94.937
<i>S.aureus</i> 4	30'	2'765'000	
<i>S.aureus</i> 2	30'	1'490'000	46.112
<i>S.aureus</i> 4	30'	2'765'000	

<i>E. coli 3</i>	30'	3'015'000	96.007
<i>E. coli 4</i>	30'	75'500'000	

<i>S.aureus 3</i>	30'	1'310'000	52.622
<i>S.aureus 4</i>	30'	2'765'000	

- 1: Glass-PB/Ag laser
- 2: clean glass laser
- 3: Glass-PB/Ag no-laser
- 4: clean glass no laser