A comparative study for the inactivation of multidrug resistance bacteria using dielectric barrier discharge and nano-second pulsed plasma

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Figure S1: (a) Voltage and current graph for NPP; (b) Voltage and current graph for Ar-DBD; (c) Temperature and (d) pH of the saline solution after the 4th discharge of NPP and 5 min Ar-DBD treatment. All values are expressed as ± SD in triplicates.

Figure S2: Determination of (a) H_2O_2 concentration, (b) OH radical, (c) NO radical in 1 ml saline after the 4th discharge of NPP and 5 min Ar-DBD treatment. All values are expressed as ± SD in triplicates. Students't-test was performed to control (* denotes P<0.05 and ** denotes P<0.01)

Figure S3: Shockwaves analysis by calculating the voltage as function of time.

Figure S4: SEM image of the Penicillum-resistant, Methicillin-resistant and Gentamicin-resistant S. aureus bacteria after the 4th discharge of NPP and 5 min Ar-DBD treatment.

Figure S5: C 1s XPS data of the wild type S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S6: O 1s XPS data of the wild type S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S7: C 1s XPS data of the Penicillum-resistant S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S8: O 1s XPS data of the Penicillum-resistant S. aureus (a) control, ((b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S9: C 1s XPS data of the Methicillin-resistant S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S10: O 1s XPS data of the Methicillin-resistant S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S11: C 1s XPS data of the Gentamicin-resistant S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S12: C 1s XPS data of the Gentamicin-resistant S. aureus (a) control, (b) after the 5 min Ar-DBD treatment and (c) after the 4th discharge of NPP.

Figure S13: Inactivation of wild type and multidrug resistance bacterial strains of S. aureus by the different pH solution. All values are expressed as ± SD in triplicates.

Figure S14: Inactivation of wild type and multidrug resistance bacterial strains of S. aureus by the Ozone treatment for 30 s (inside the solution and 10 mm above the solution). All values are expressed as ± SD in triplicates.

Figure S15: Amount of Ozone produced for 5 min in Ar-DBD. All values are expressed as ± SD in triplicates.

Figure S16: Inactivation of wild type and multidrug resistance bacterial strains of S. aureus by the pH 4 solution with 50 μM H_2O_2. All values are expressed as ± SD in triplicates.

Table S1. Primers used in expression analysis

Name	Forward sequence	Reverse sequence
MecA	ATGAGATTAGGCATCGTTCC	TGGATGACAGTACCTGAGCC
MecI	CTGCAGAATGGGAAGTTATG	TTACAAGTGAATTGAAACCGCAGA
mecRI	CAAAAGCACCGTTACTATCTGC	GAGTAAATTTTGGTCGAATGCTA
femA	ACAATGATGGCGAGATTACAGGA	ACC GCTAAAGGTACTAACAACAT
16S	AGAGCAAGCGGACCTCATAA	TTCATGGAGTCGAGTTGCAG

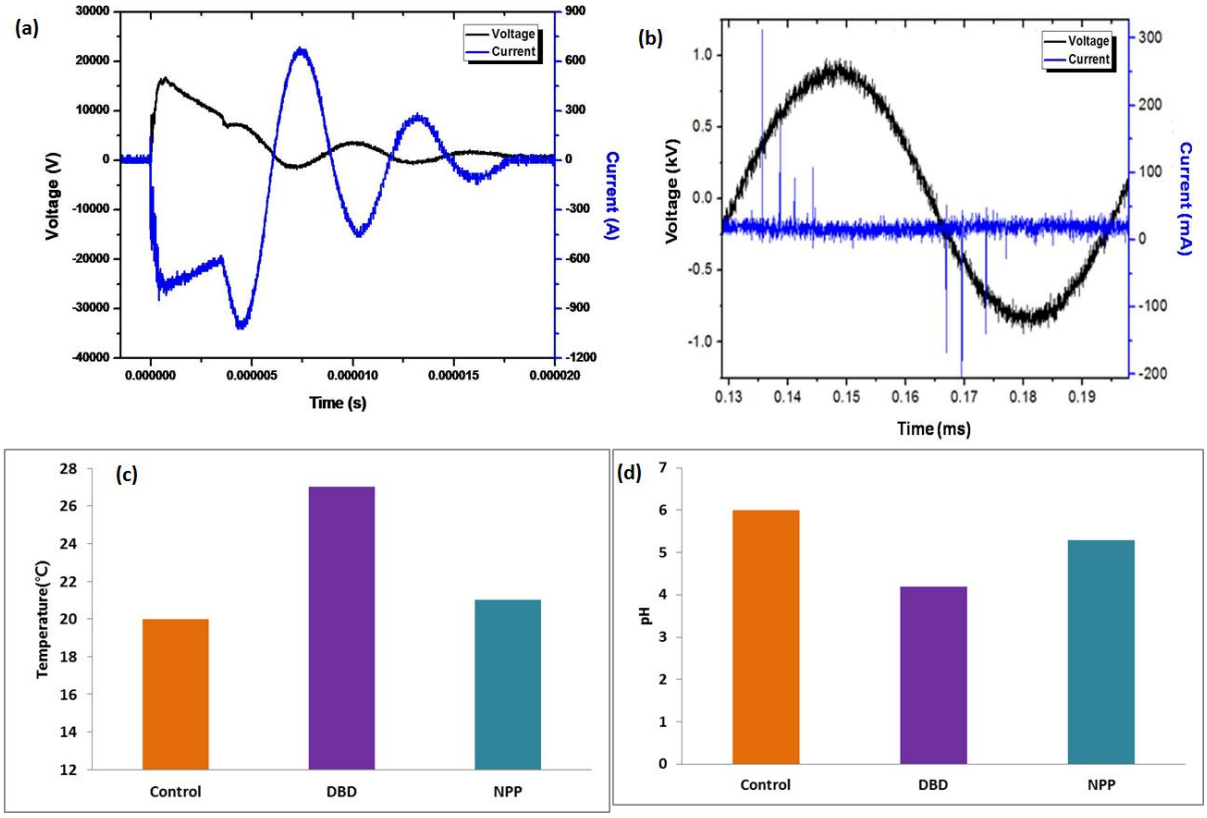


Figure S1

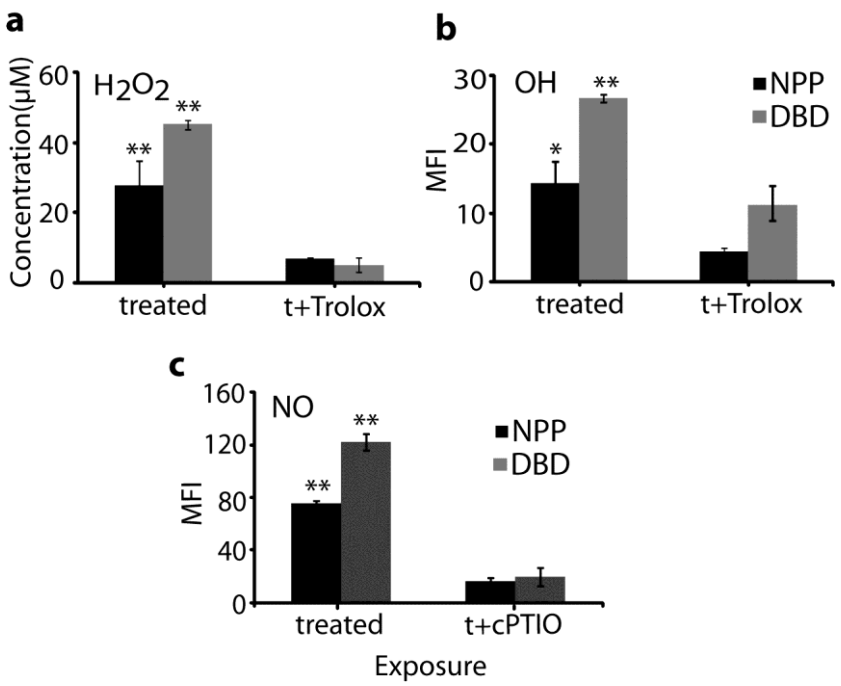


Figure S2

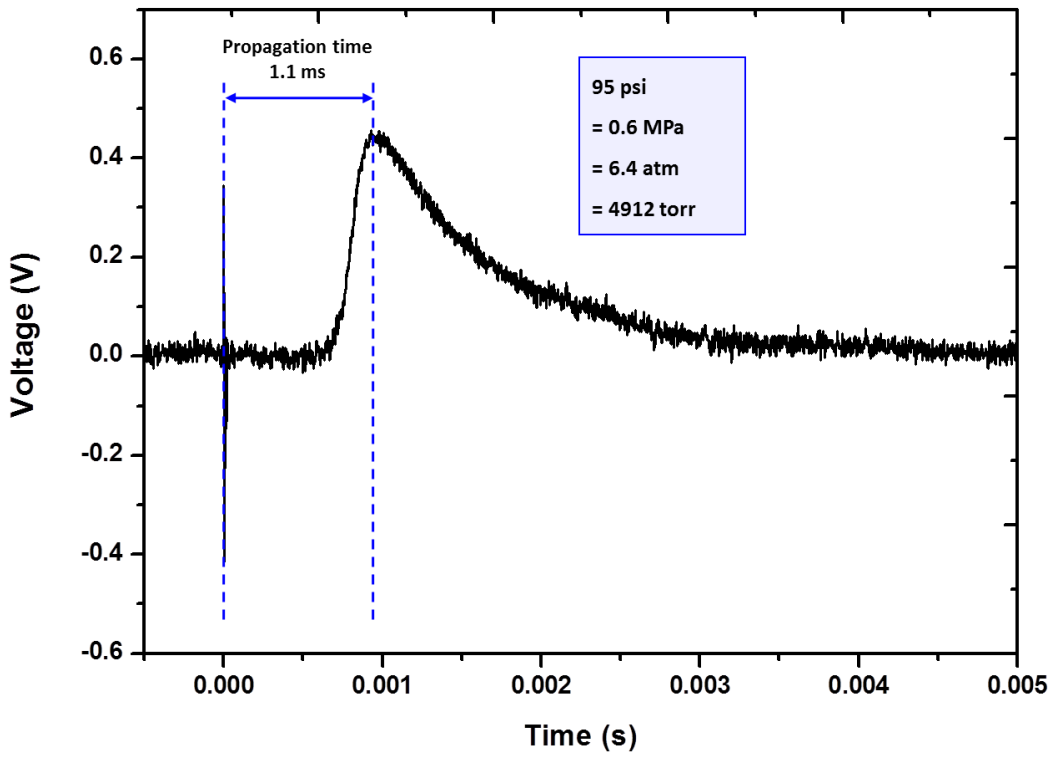

Propagation time
1.1 ms
95 psi
= 0.6 MPa
= 6.4 atm
= 4912 torr
Voltage (V)
Time (s)
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
0.000
0.001
0.002
0.003
0.004
0.005

Figure S3

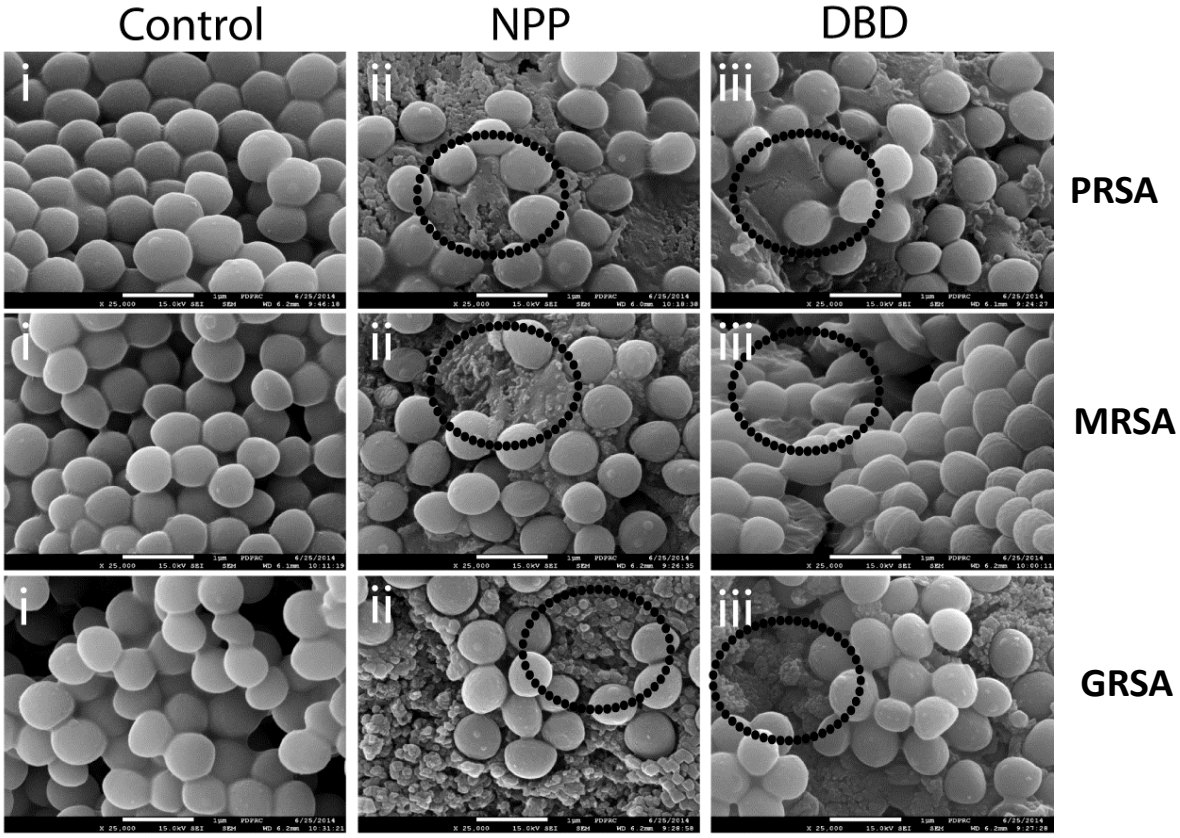


Figure S4.

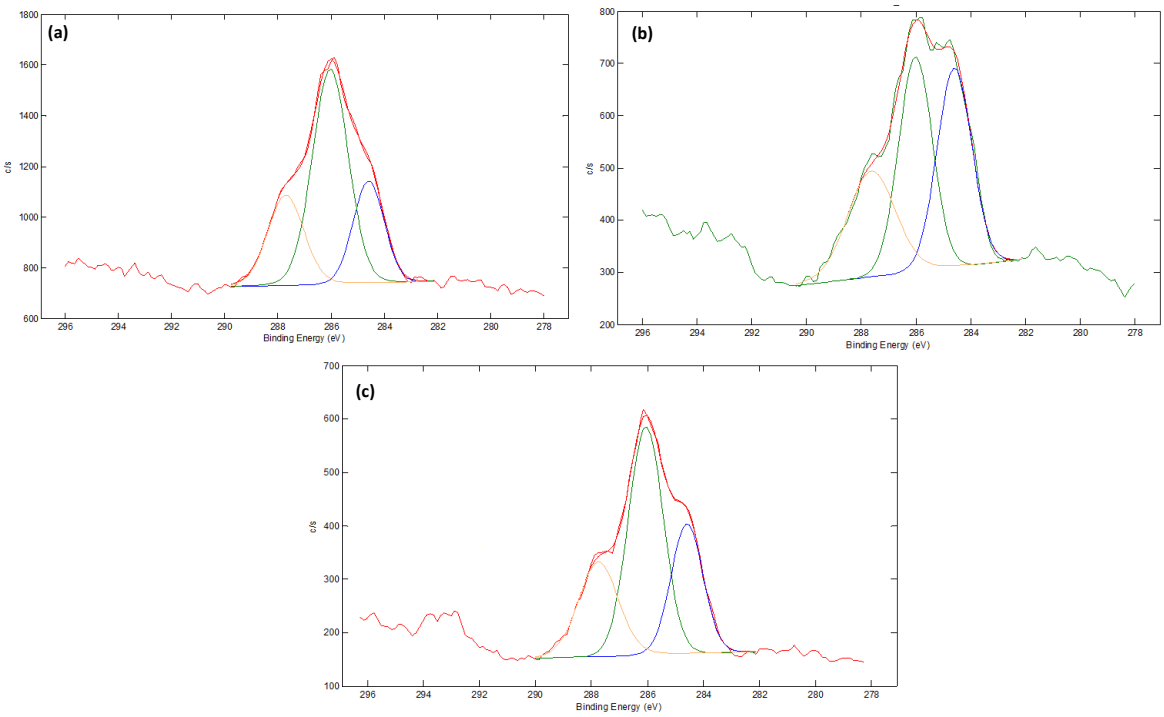
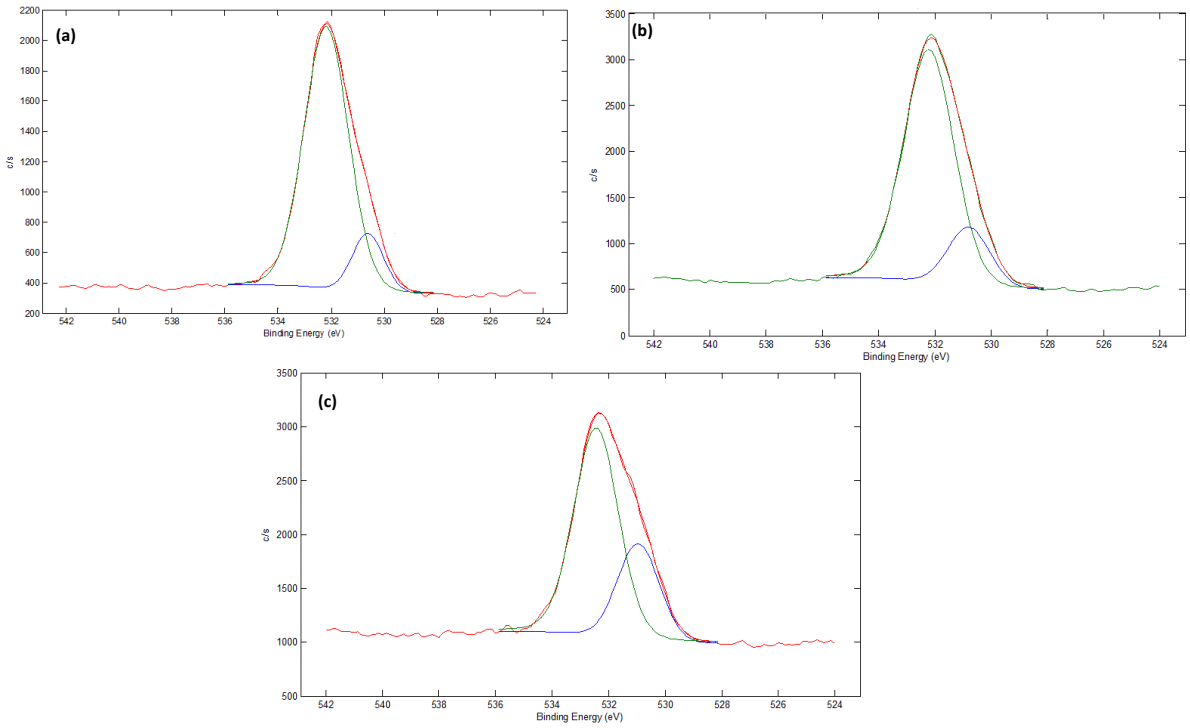


Figure S5.



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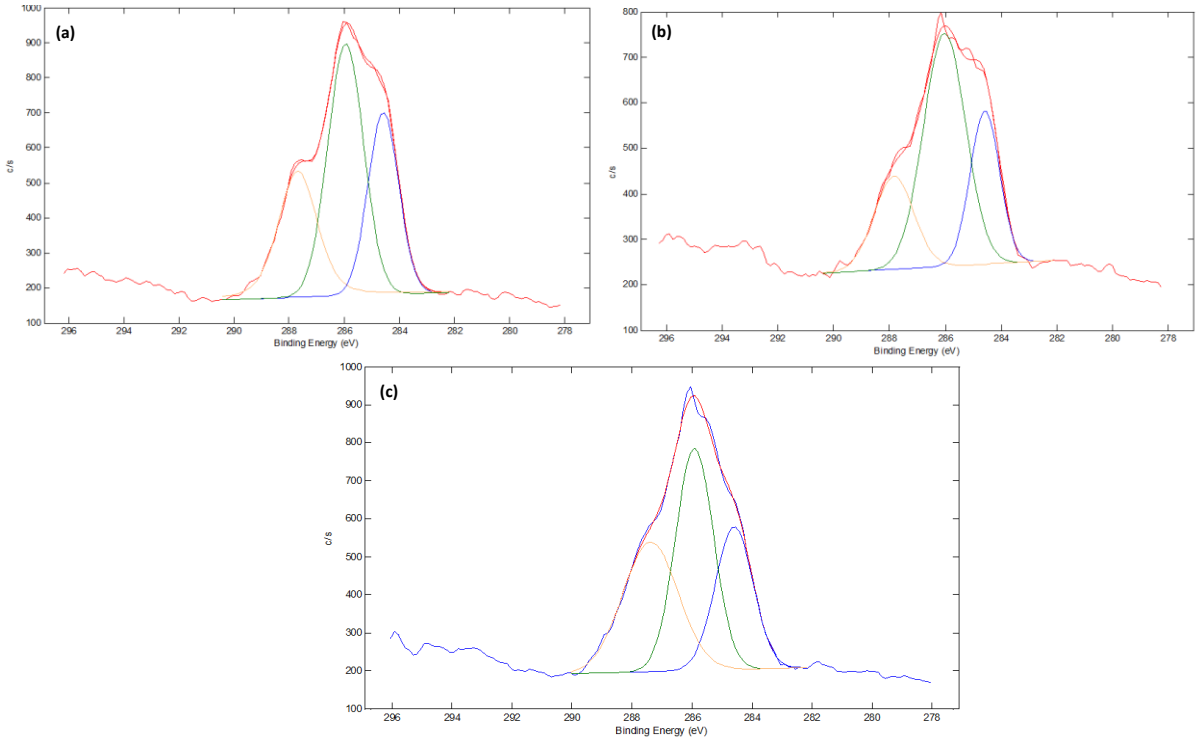


Figure S7.

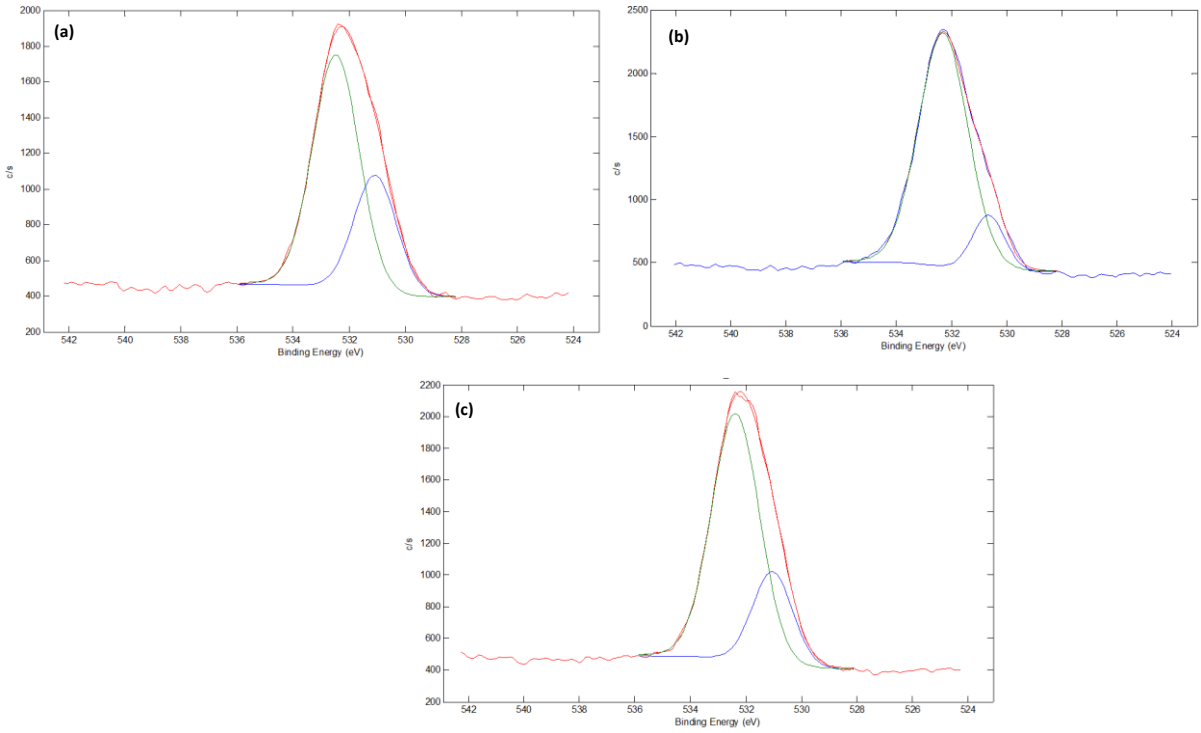


Figure S8.

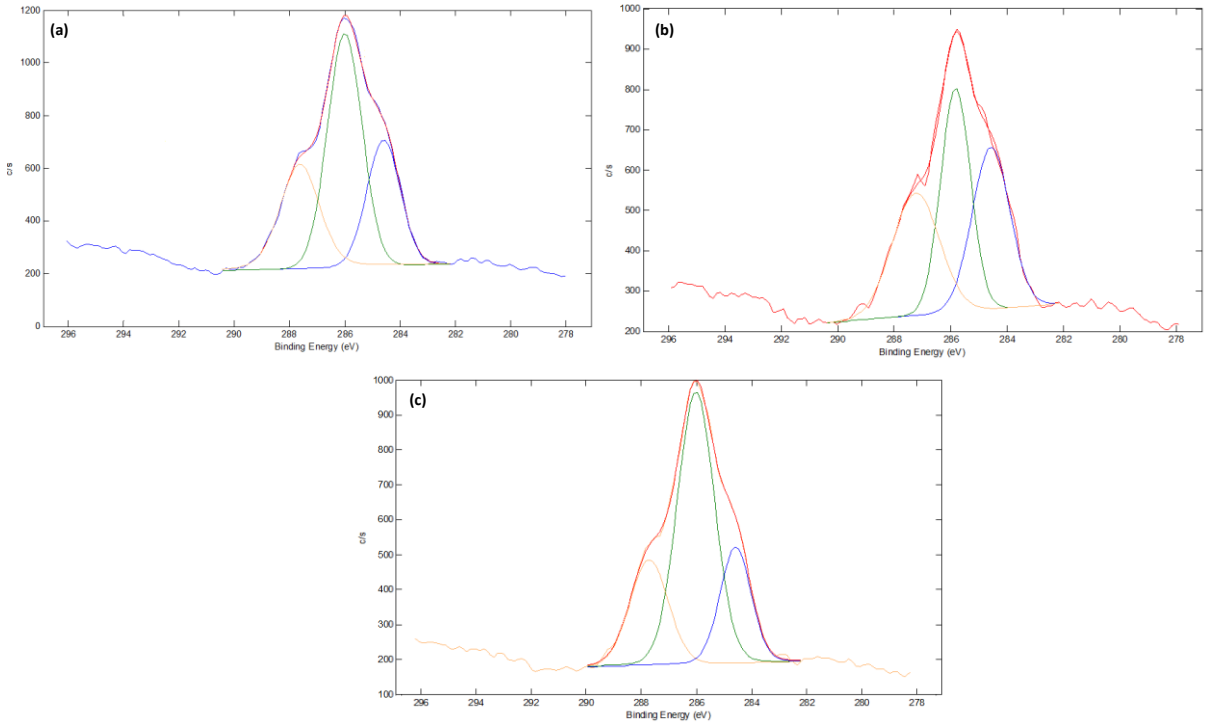


Figure S9.

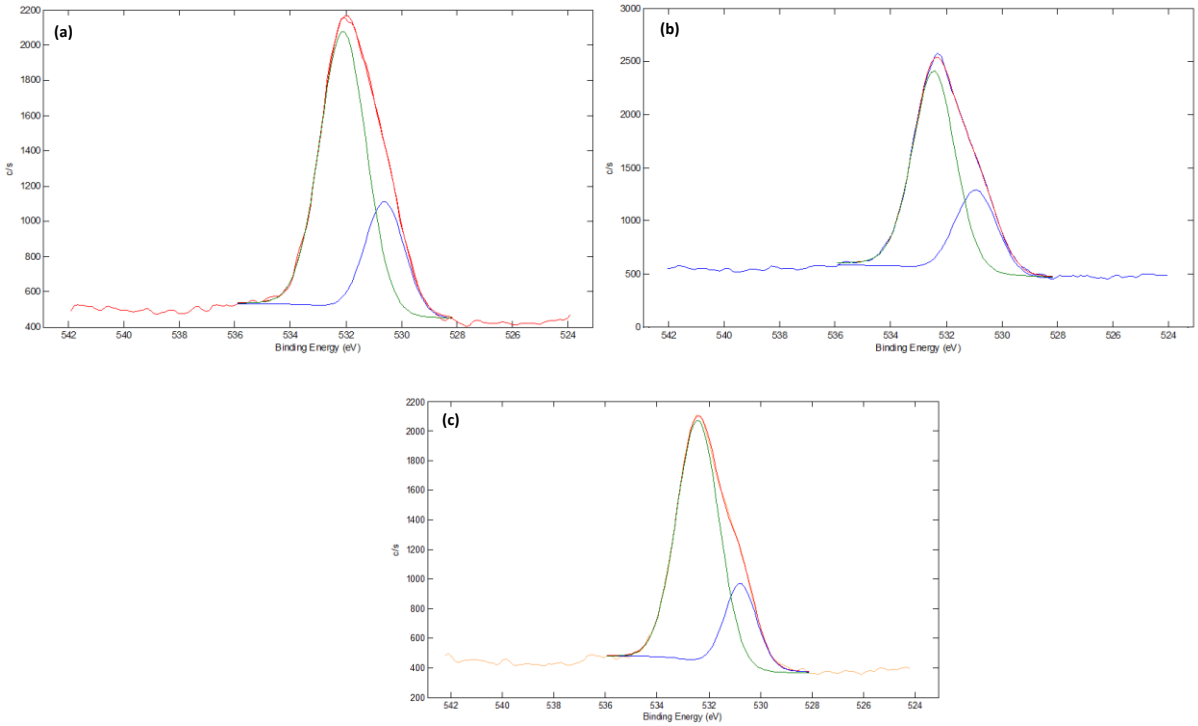


Figure S10.

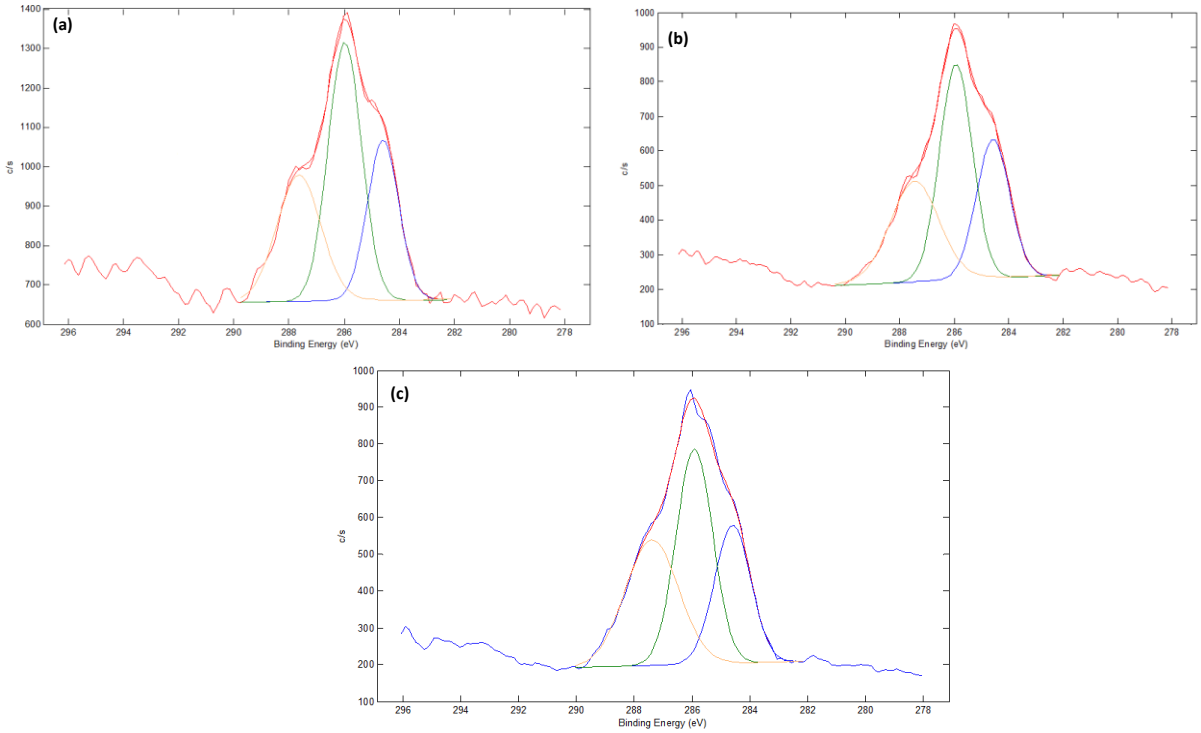


Figure S11.

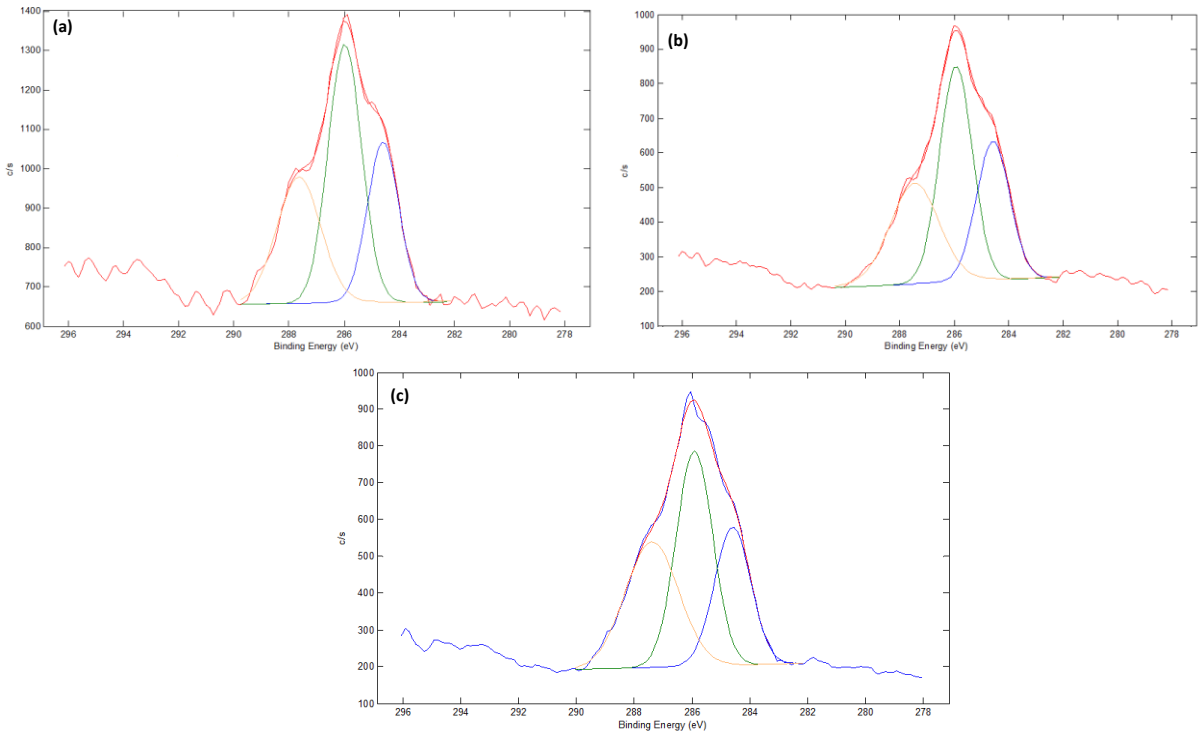
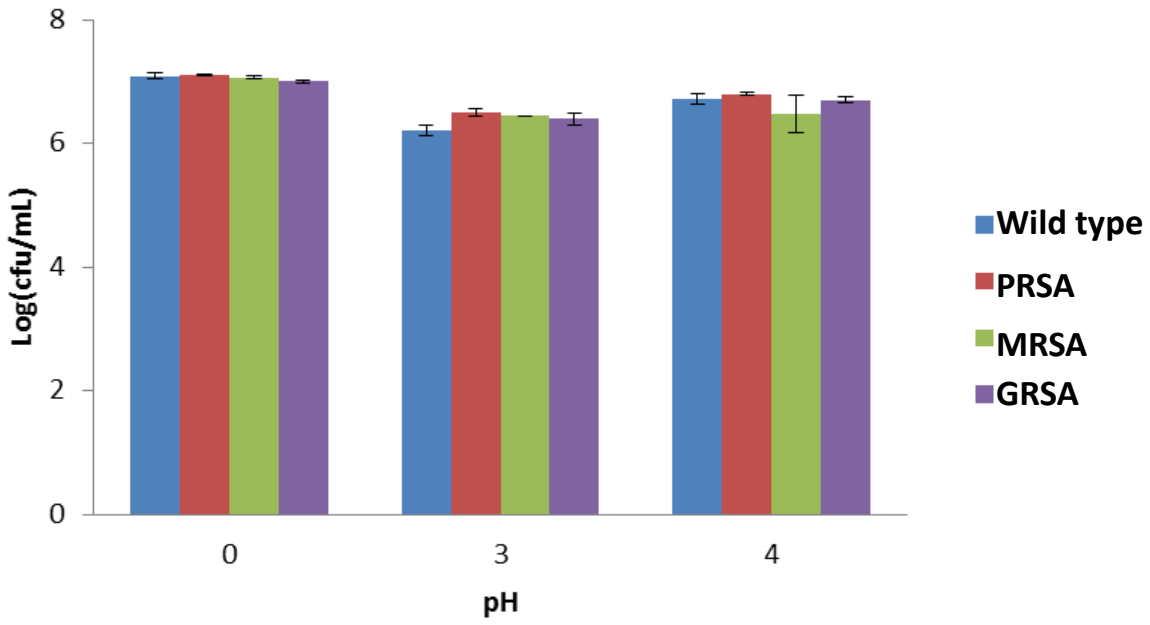


Figure S12.



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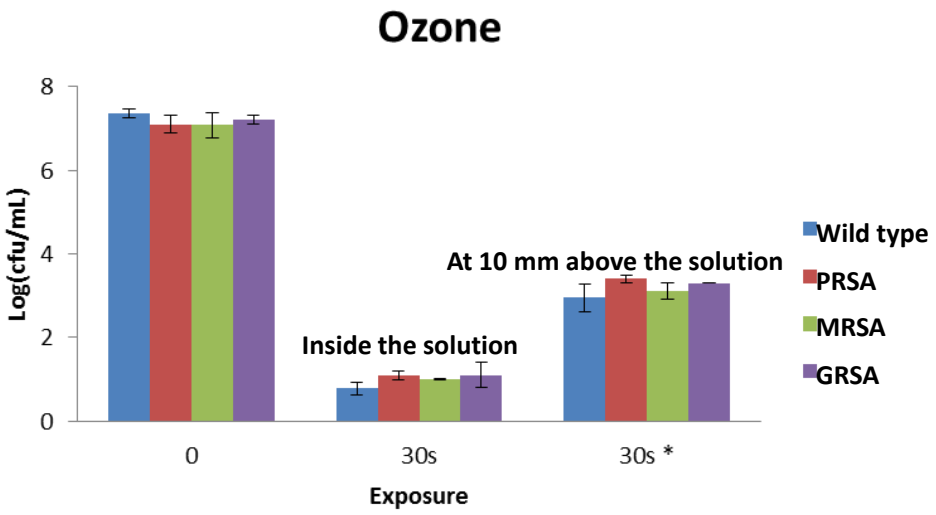

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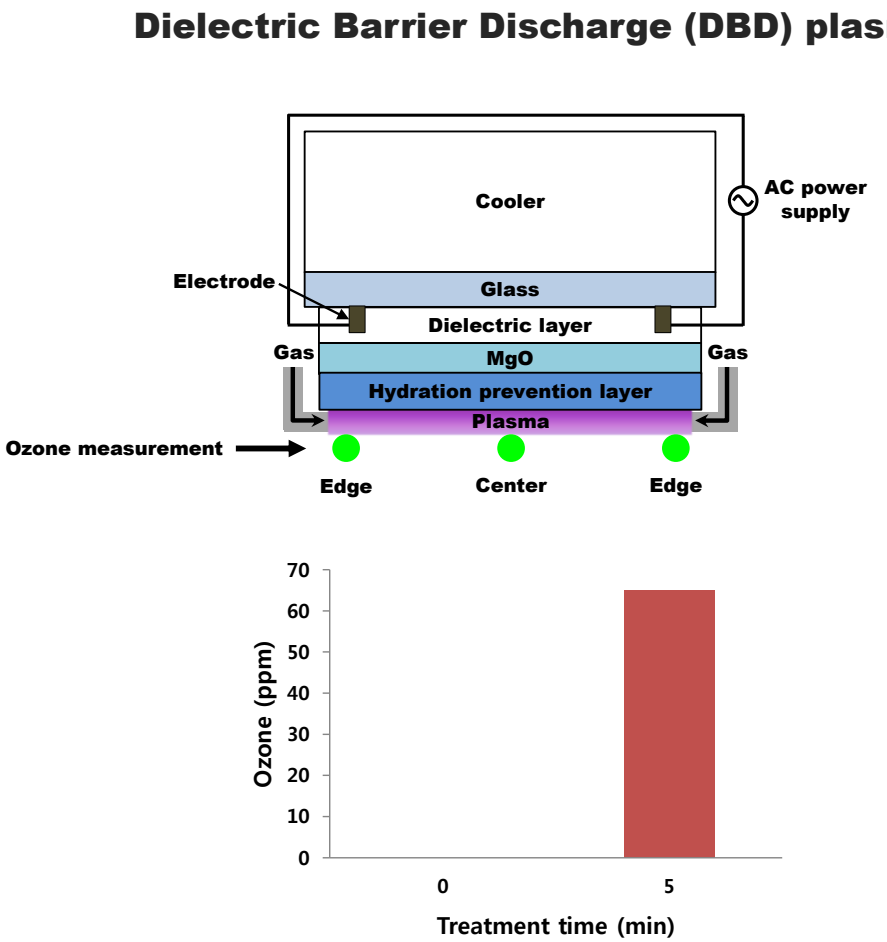

Figure S15.

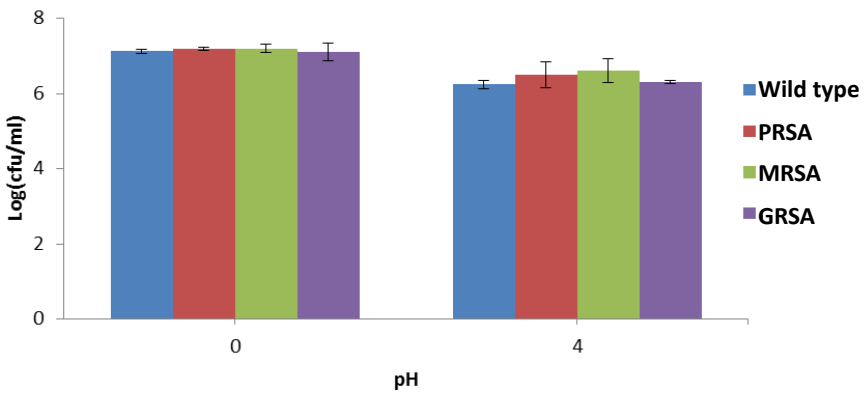

Figure S16.