

Supporting information

Photo-induced antibacterial activity of four graphene based nanomaterials on a wide range of bacteria

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Table S1. Average values of zeta potentials of graphene based nanoparticles.

Sample	Zeta potential (mV)
GO	-29.3±1
GQDs	-21.1±1
CQDCA	-26.3±1
CQDNH	-22.8±1

Table S2. The values of characteristic bonds detected in all samples in atomic% (At%).

Sample	GO	GQDs	CQDCA	CQDNH
C1s sp ²	23.2	58.8	33.5	15.0
C1s sp ³	35.7	27.7	34.6	32.8
C1s C–O	33.7	8.4	19.6	12.1

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C1s C=O	1.4	5.1	6.3	8.8
C1s O-C=O	3.9	0.0	5.8	-
C1s π - π^*	2.1	0.0	0.1	-
C1s NC=O	-	-	-	31.2

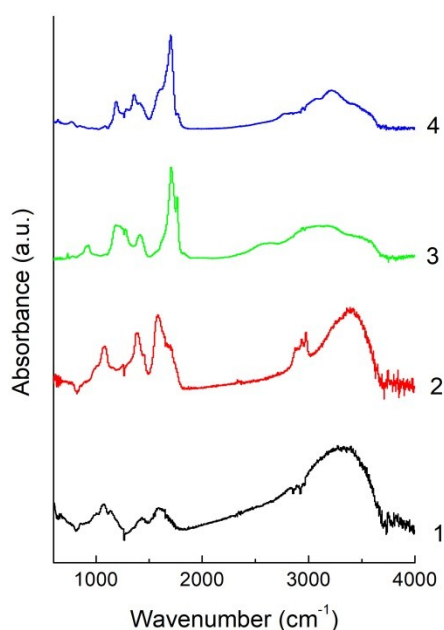


Fig. S1. FTIR spectra of the: GO (curve 1), GQDs (curve 2), CQDCA (curve 3) and CQDNH (curve 4) samples.

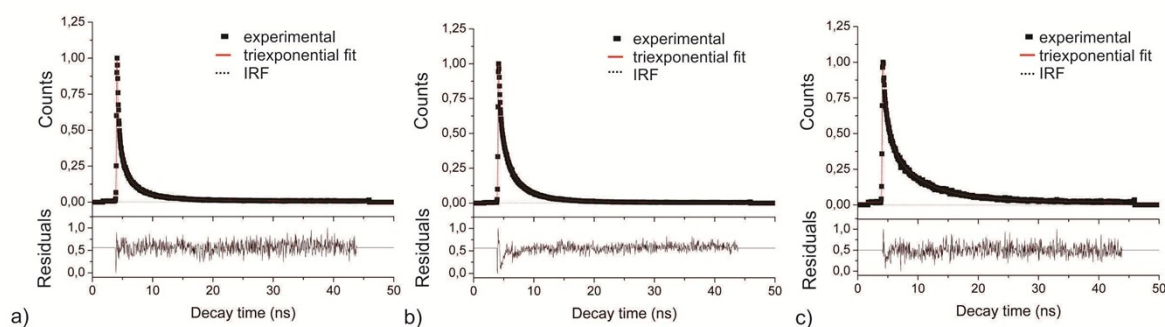


Fig. S2. Decay profile of the: a) GQDs, b) CQDCA, c) CQDNH samples at room temperature. Red curves on all diagrams show fitting curves obtained by triple-exponential fitting whereas dash curves designate instrument response function (IRF). Bottom diagrams show residuals.

Table S3. The values of MBC ($\mu\text{g/mL}$) of the GO, GQD, CQDCA and CQDNH samples.

Bacteria strains	MBC ($\mu\text{g/mL}$)				
	GO	GQDs	CQDCA	CQDNH	A*
<i>S. saprophyticus</i> ATCC 15035	>2000.0	31.24 $\pm$ 0.98	15.62 $\pm$ 0.48	15.62 $\pm$ 1.94	0.48 $\pm$ 0.04
<i>S. aureus</i> ATCC 25923	>4000.0	250.00 $\pm$ 1.94	125.00 $\pm$ 0.98	125.00 $\pm$ 0.98	1.94 $\pm$ 0.06
<i>L. ivanovii</i> ATCC 19119	>6000.0	125.00 $\pm$ 1.94	125.00 $\pm$ 0.98	62.50 $\pm$ 0.48	0.98 $\pm$ 0.04
<i>L. innocua</i> ATCC 33090	>8000.0	250.00 $\pm$ 0.98	250.00 $\pm$ 1.94	125.00 $\pm$ 0.48	1.94 $\pm$ 0.06
<i>E. faecalis</i> ATCC 2912	>2000.0	500.00 $\pm$ 0.48	500.00 $\pm$ 0.48	250.00 $\pm$ 0.98	0.98 $\pm$ 0.04
<i>L. monocytogenes</i> ATCC 19112	>6000.0	31.24 $\pm$ 0.48	15.62 $\pm$ 0.98	15.62 $\pm$ 0.48	0.98 $\pm$ 0.04
<i>B. spizizenii</i> ATCC 6633	>2000.0	250.00 $\pm$ 1.94	250.00 $\pm$ 0.48	125.00 $\pm$ 1.94	0.48 $\pm$ 0.04
<i>E. faecium</i> ATCC 6057	>8000.0	125.00 $\pm$ 0.98	125.00 $\pm$ 0.48	62.50 $\pm$ 0.48	1.94 $\pm$ 0.06
<i>E. coli</i> ATCC 25922	>1000.0	125.00 $\pm$ 0.98	62.50 $\pm$ 1.94	62.50 $\pm$ 0.98	0.98 $\pm$ 0.04
<i>S. enteritidis</i> ATCC 13076	>4000.0	500.00 $\pm$ 0.48	250.00 $\pm$ 1.94	250.00 $\pm$ 0.48	1.94 $\pm$ 0.06
<i>E. aerogenus</i> ATCC 13048	>1000.0	15.62 $\pm$ 1.94	15.62 $\pm$ 0.48	7.81 $\pm$ 1.94	0.98 $\pm$ 0.04
<i>C. freundii</i> ATCC 43864	>6000.0	125.00 $\pm$ 0.48	125.00 $\pm$ 0.48	62.50 $\pm$ 0.98	0.98 $\pm$ 0.04
<i>S. typhimurium</i> ATCC 14028	>8000.0	31.24 $\pm$ 0.98	15.62 $\pm$ 0.48	15.62 $\pm$ 1.94	0.48 $\pm$ 0.04
<i>P. aeruginosa</i> ATCC 27853	>1000.0	125.00 $\pm$ 1.94	125.00 $\pm$ 0.48	62.50 $\pm$ 0.98	1.94 $\pm$ 0.06
<i>P. mirabilis</i> ATCC 35659	>2000.0	15.62 $\pm$ 0.98	15.62 $\pm$ 0.98	7.81 $\pm$ 1.94	0.98 $\pm$ 0.04
<i>Staphylococcus aureus</i> ATCC 25923	>4000.0	250.00 $\pm$ 1.94	250.00 $\pm$ 0.98	125.00 $\pm$ 0.48	1.94 $\pm$ 0.06
<i>Klebsiella pneumoniae</i> ATCC 13883	>1000.0	31.24 $\pm$ 0.98	15.62 $\pm$ 0.48	15.62 $\pm$ 0.98	0.98 $\pm$ 0.04
<i>Proteus vulgaris</i> ATCC 13315	>2000.0	250.00 $\pm$ 0.48	125.00 $\pm$ 0.98	125.0 $\pm$ 1.94	0.98 $\pm$ 0.04
<i>Bacillus subtilis</i> ATCC 6633	>1000.0	125.00 $\pm$ 1.94	62.50 $\pm$ 0.48	62.50 $\pm$ 0.98	0.98 $\pm$ 0.04

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