SUPPLEMENTAL FIGURE LEGENDS:

Supplemental Figure S1: Idealized ZnO-NP geometries

Supplemental Figure S2: (A) Amplitude plot from AFM of ZnO-NP plates with three cross-sections (labeled 1, 2, and 3). (B) For each cross section height profiles are shown.

Supplemental Figure S3: Reduction in CFUs/ml after brief exposure to aqueous suspensions of ZnO-NPs synthesized as plates, pyramids, and spheres.

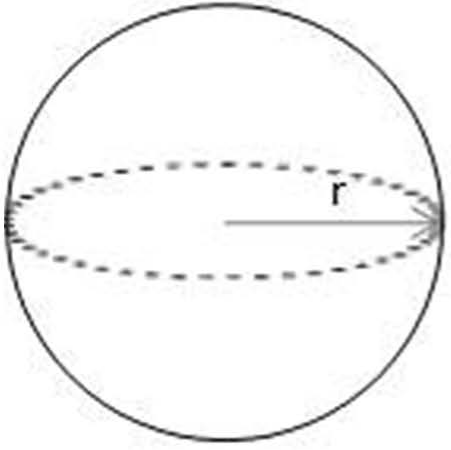
Supplemental Figure S4: Fraction of cells that partition to the (A) hexadecane interface, (B) chloroform minus the hexadecane interface, and (C) diethyl ether minus the hexane interface at mid-log versus stationary phase for each organism.

Supplemental Figure S5: UV-vis spectra and A_{350} (inset) for LBL coatings as a function of layer number.

Supplemental Figure S6: SEM micrographs of (A) bare polystyrene pegs, pegs coated in ZnO (B) plates, (C) pyramids, and (D) spheres.

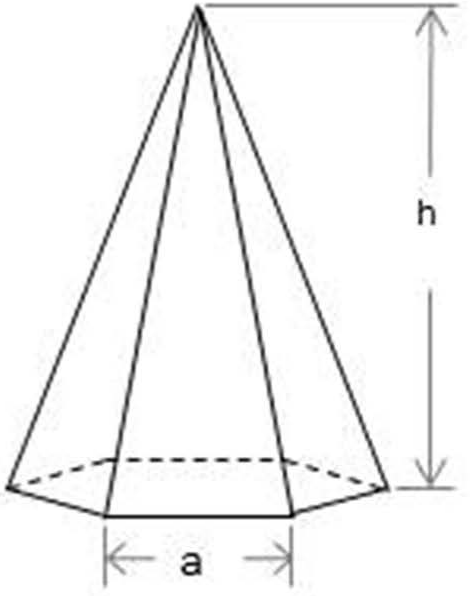
Supplemental Figure S7: Amplitude (A) and 3D contour plots (B) from AFM of glass substrates coated with ZnO spheres, pyramids, and plates via LBL.

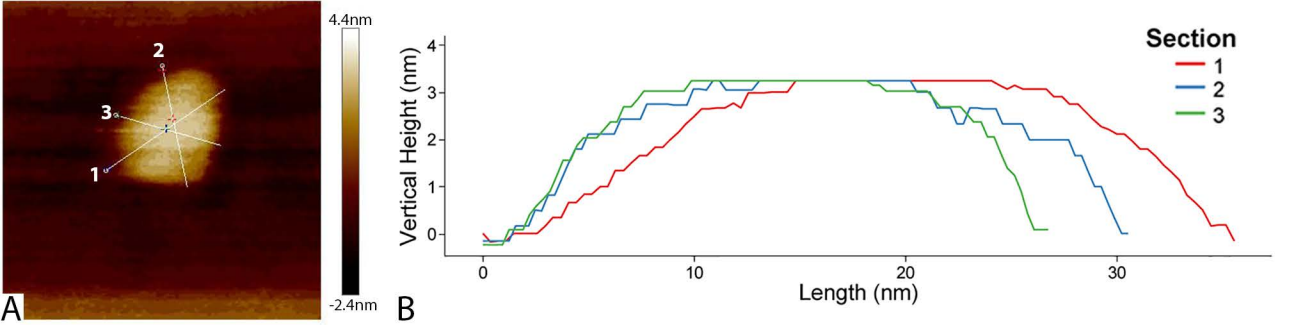
Sphere



Plate

Pyramid




4.4nm
-2.4nm
1
2
3
A
B
Vertical Height (nm)
Length (nm)
Section
1
2
3
0
1
2
3
4
0
10
20
30

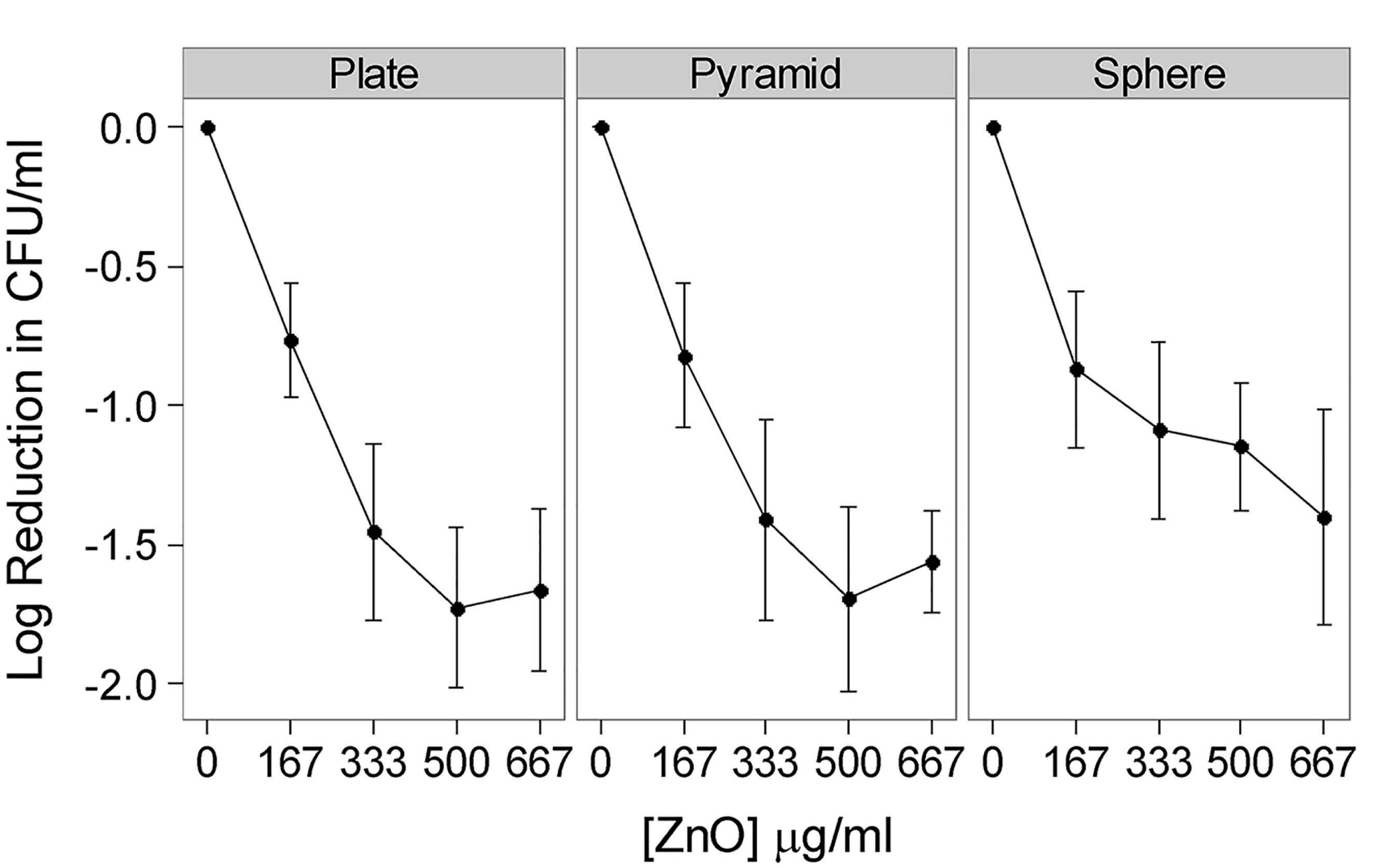
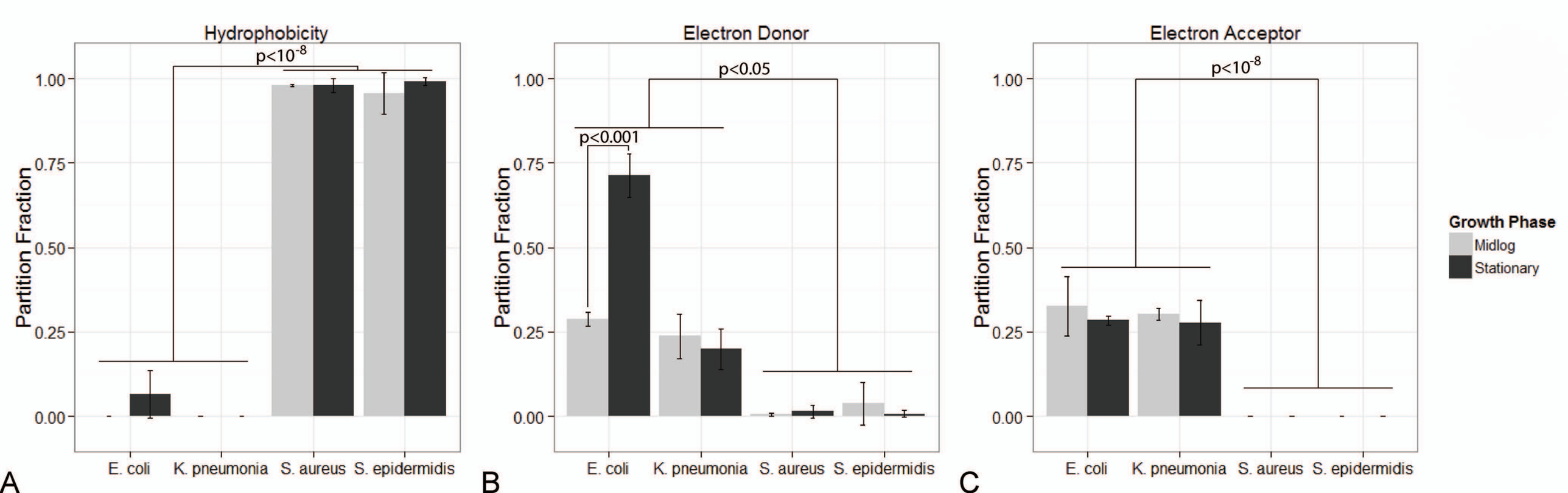
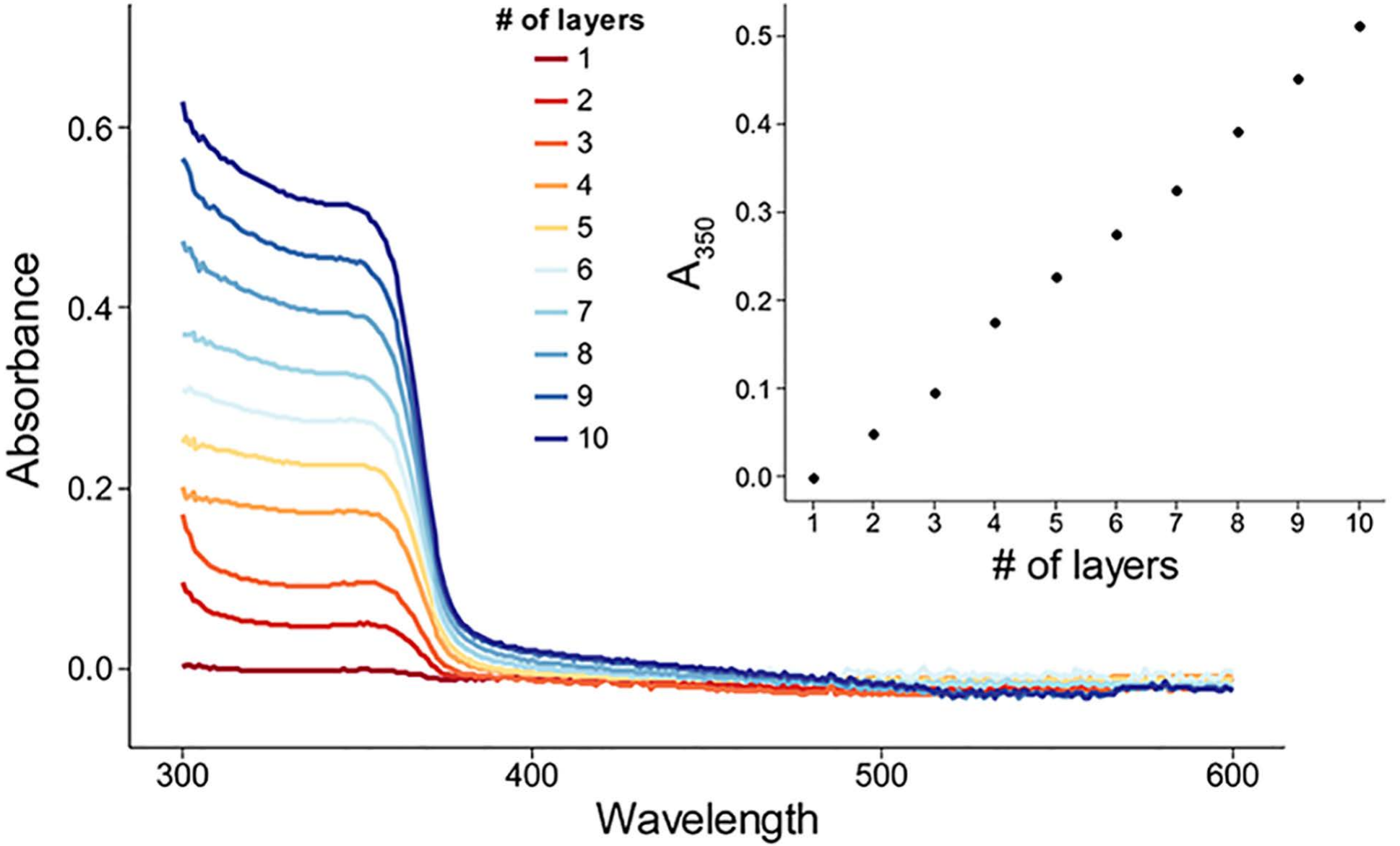
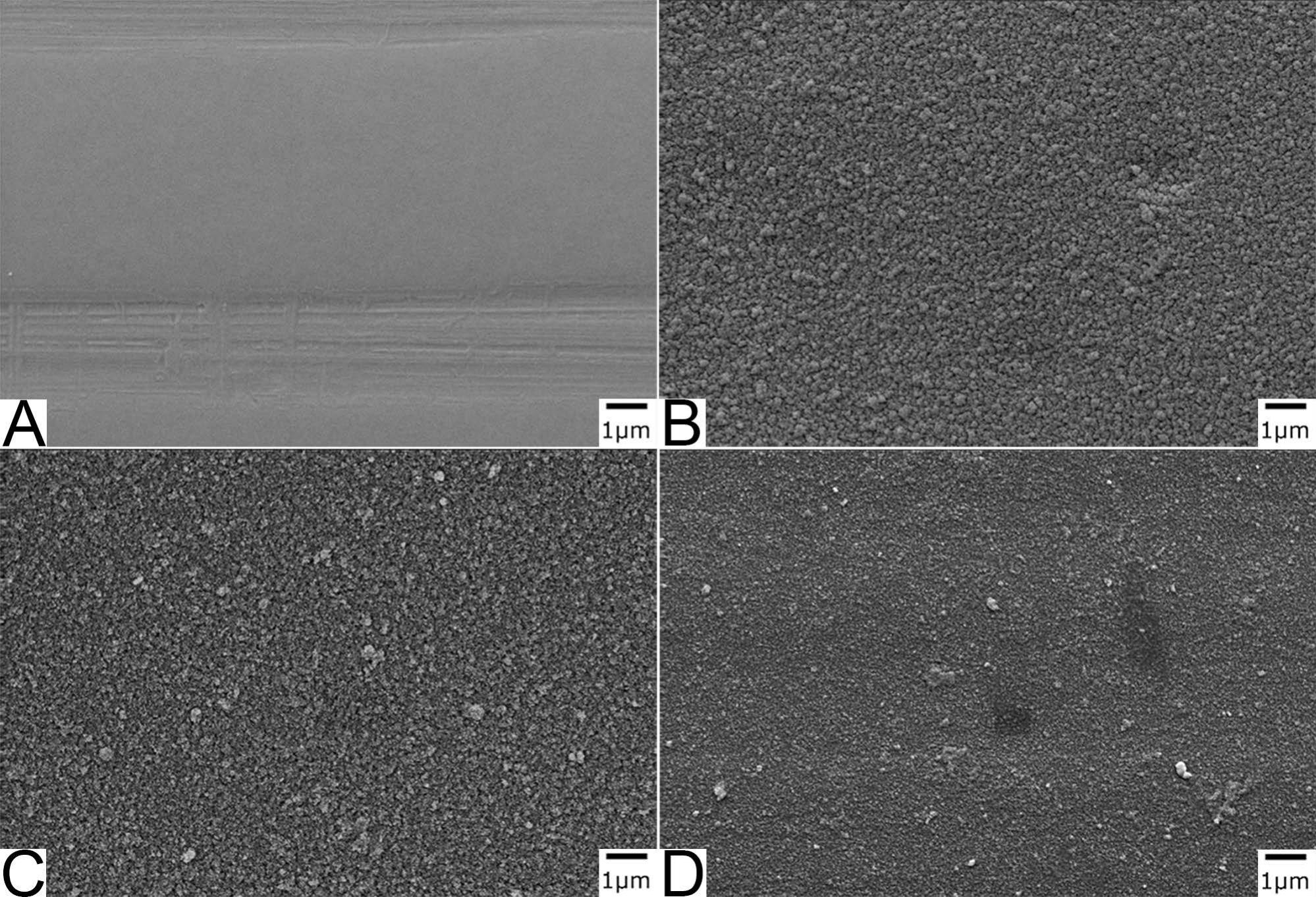


Plate
Pyramid
Sphere
Log Reduction in CFU/ml
0.0
-0.5
-1.0
-1.5
-2.0
0
167
333
500
667
[ZnO] μg/ml


Hydrophobicity
p<10-8
Partition Fraction
1.00
0.75
0.50
0.25
0.00
E. coli
K. pneumonia
S. aureus
S. epidermidis
A
Electron Donor
p<0.05
p<0.001
Partition Fraction
1.00
0.75
0.50
0.25
0.00
E. coli
K. pneumonia
S. aureus
S. epidermidis
B
Electron Acceptor
p<10-8
Partition Fraction
1.00
0.75
0.50
0.25
0.00
E. coli
K. pneumonia
S. aureus
S. epidermidis
C
Growth Phase
Midlog
Stationary


# of layers
1
2
3
4
5
6
7
8
9
10
Absorbance
0.0
0.2
0.4
0.6
300
400
500
600
Wavelength
A_{350}
0.0
0.1
0.2
0.3
0.4
0.5
1
2
3
4
5
6
7
8
9
10
# of layers


A
1μm
B
1μm
C
1μm
D
1μm

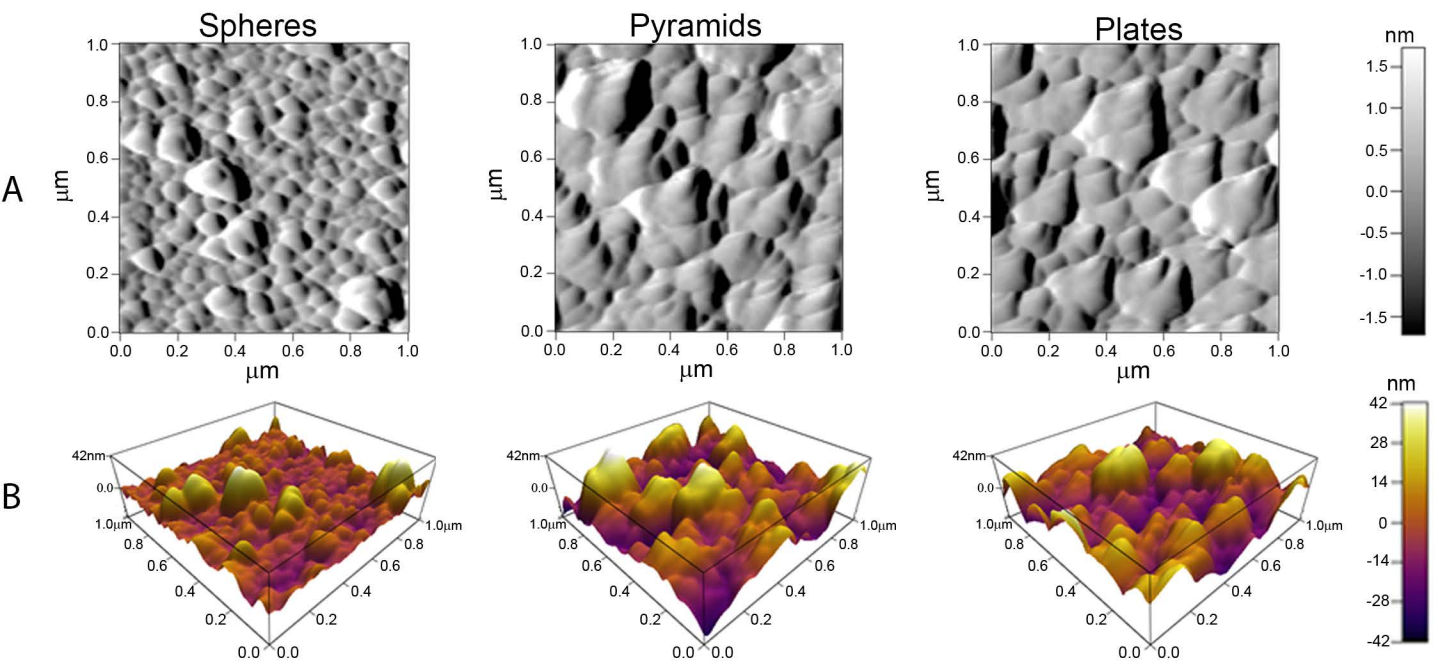

Spheres
Pyramids
Plates
A
B
µm
nm
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
42nm
0.0
1.0µm
0.8
0.6
0.4
0.2
42
28
14
0
-14
-28
-42

Table S1. ZnO-NP synthesis parameters

	Plates	**Pyramids**	**Spheres**
final [KOH] (mM)	162	35	162
final [ZnAcetate] (mM)	228	250	228
solvent	90% v/v methanol	90% v/v methanol	Anhydrous methanol
reflux time (hrs)	14	48	14
pH of final NP aqueous suspension	7.5	7.06	7.23
zeta potential of final NP aqueous suspension (mV)	44.1	37.2	34.4

Table S2. Idealized geometry formulas

shape	volume (V)	surface area (S_A)
sphere	$\frac{4}{3}\pi r^3$	$4\pi r^2$
plate	$\pi r^2 h$	$2\pi hr + 2\pi r^2$
pyramid	$\frac{\sqrt{3}}{2}a^2 h$	$\frac{3\sqrt{3}}{2}a^2 + 3a\sqrt{h^2 + \frac{3a^2}{4}}$

Table S3. Root mean square (RMS) roughness and water contact angle for LBL coatings

Sample	RMS roughness (nm)	Water contact angle
glass	0.3	
plate	16.7	18º
pyramid	12.7	56º
sphere	12.8	26º

Table S4. Zeta potential for bacterial strains (mean ± standard deviation)

	Zeta potential (mV)
E. coli	-46.6 ± 1.3
K. pneumoniae	-22.8 ± 0.7
S. aureus	-25.6 ± 0.8
S. epidermidis	-26.0 ± 2.5