Supporting Information

Redox Cycling-Based Detection of Phenazine Metabolites Secreted from *Pseudomonas aeruginosa* in Nanopore Electrode Arrays

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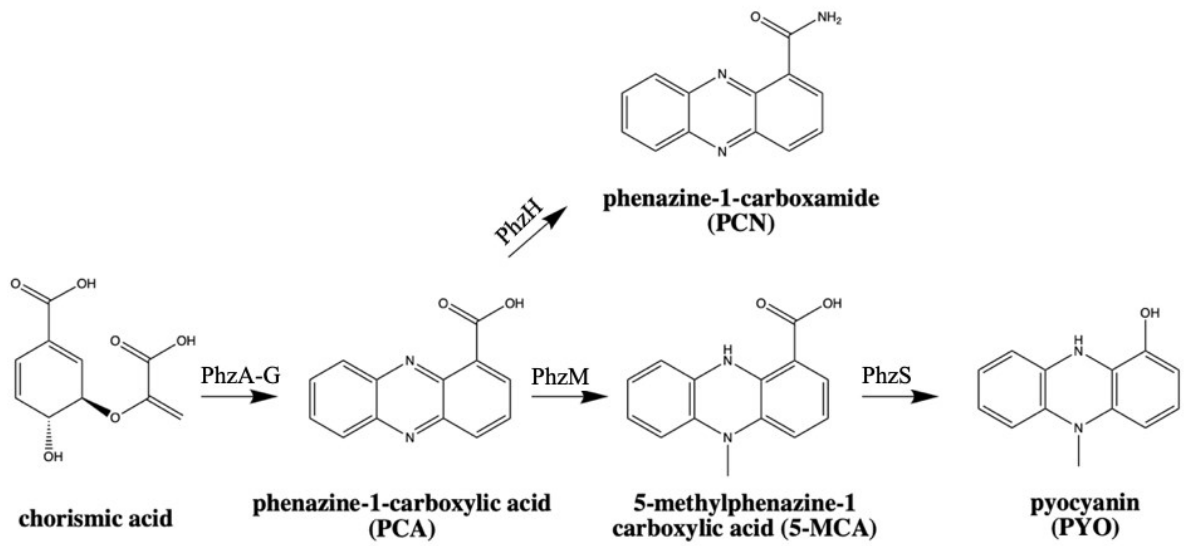

Figure S1. Biosynthetic route for sequential phenazine production in *P. aeruginosa*. The enzymes responsible for catalyzing each biosynthetic reaction are identified above the reaction arrow. Note that a number of independent reactions are collapsed into the first step, and these are catalyzed by enzymes PhzA-G.

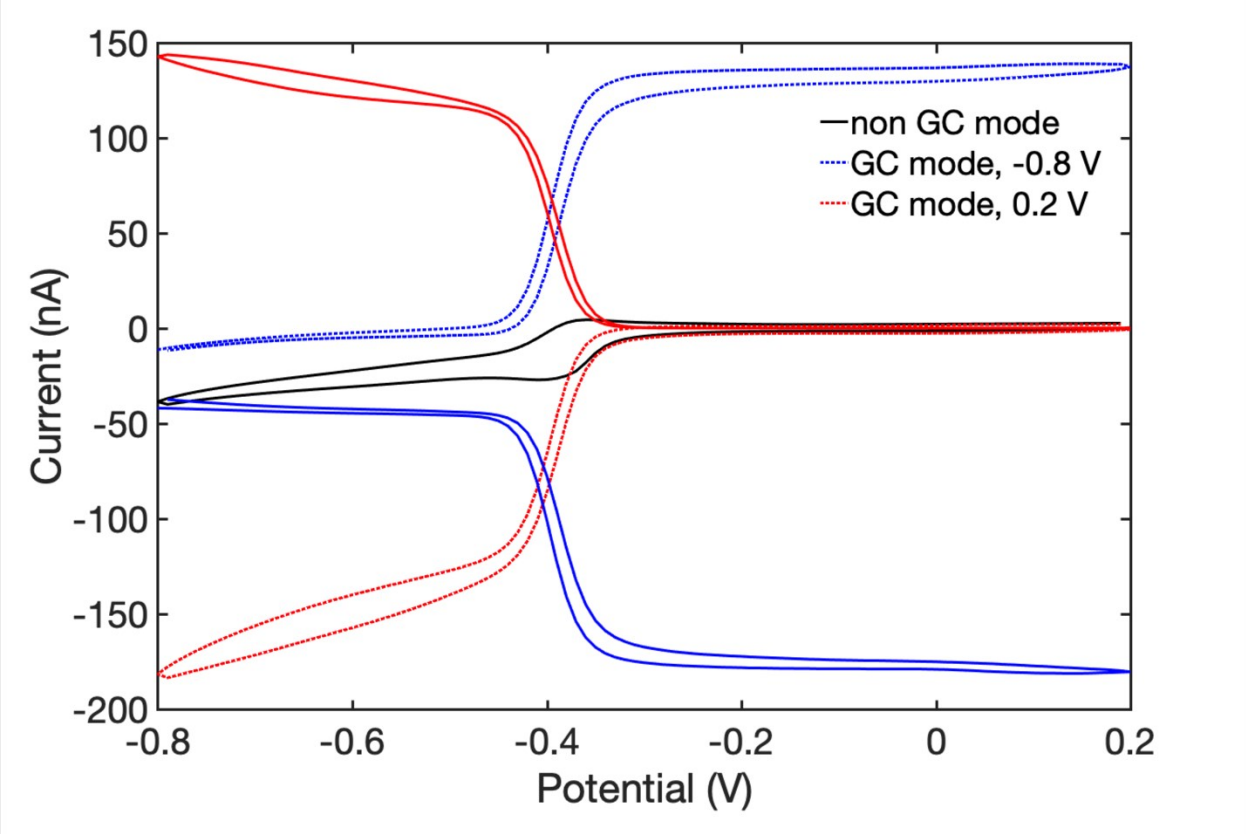

Figure S2. Non-GC (black) and GC (blue and red) mode cyclic voltammograms of 100 μM PYO in FAB minimal growth medium electrolyte in NEAs. The non-GC mode voltammogram (black) was obtained with BE as working electrode in 3-electrode system while leaving TE at open-circuit potential. For GC mode operation, BE and TE were both used as working electrodes in 4-electrode system where BE was swept between +0.2 V and –0.8 V while TE was held at +0.2 V (red) or –0.8 V (blue).

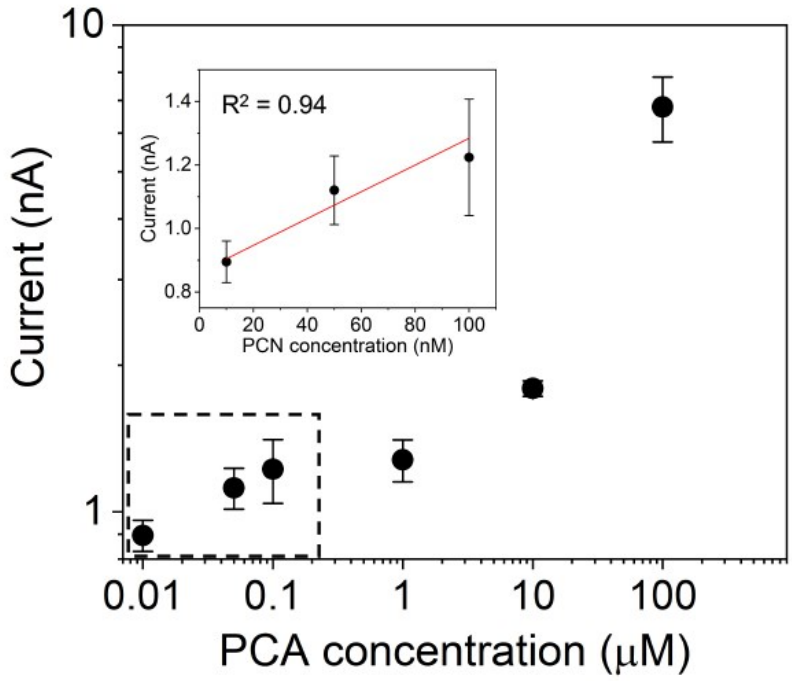

Figure S3. Calibration plot of PCA generated from the GC mode voltammograms. The anodic current at E_{TE} = +0.2 V was used to produce the calibration plot when E_{BE} was at −0.8 V during its potential sweep. (*Inset*) Current response in the concentration range from 10 to 100 nM. The mean values and error bars were obtained from three-independent measurements.

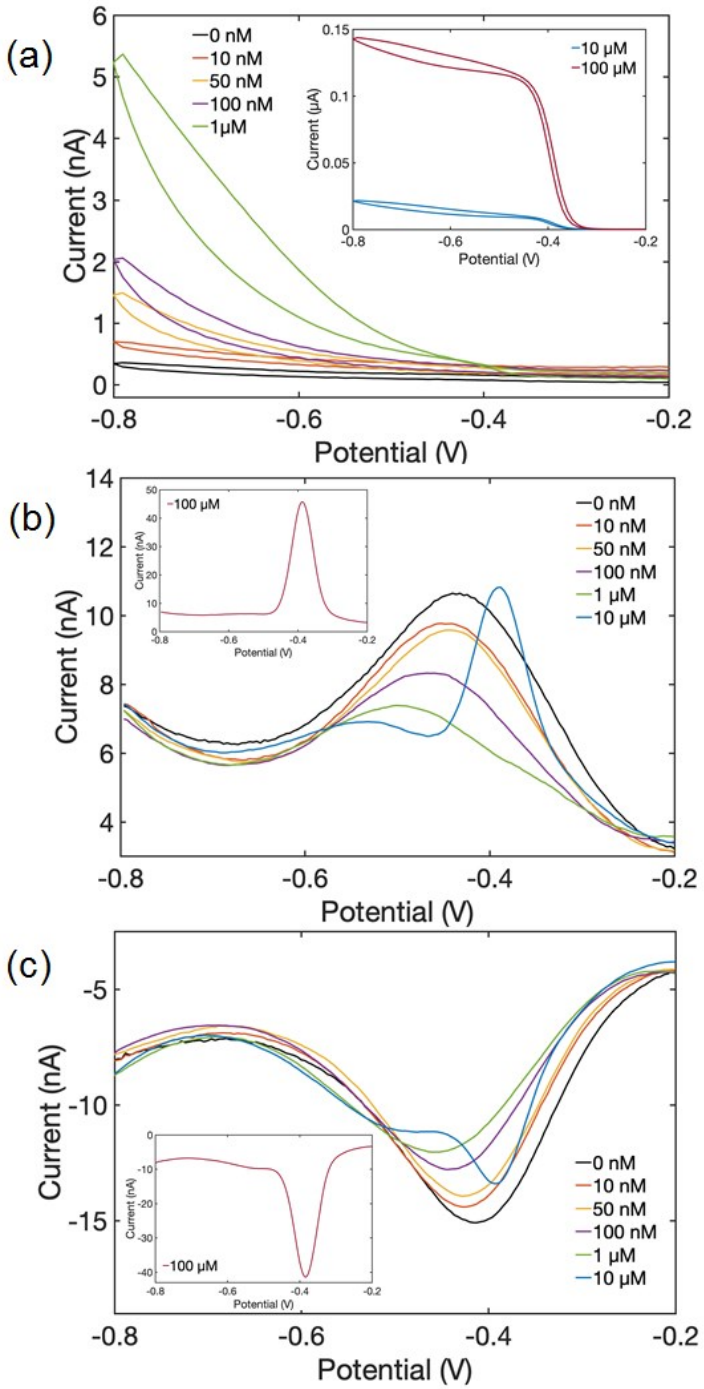

Figure S4. (a) Representative anodic GC mode current responses for PYO taken from TE. (b,c) Representative oxidative (b) and reductive (c) SW voltammograms as a function of PYO concentration.

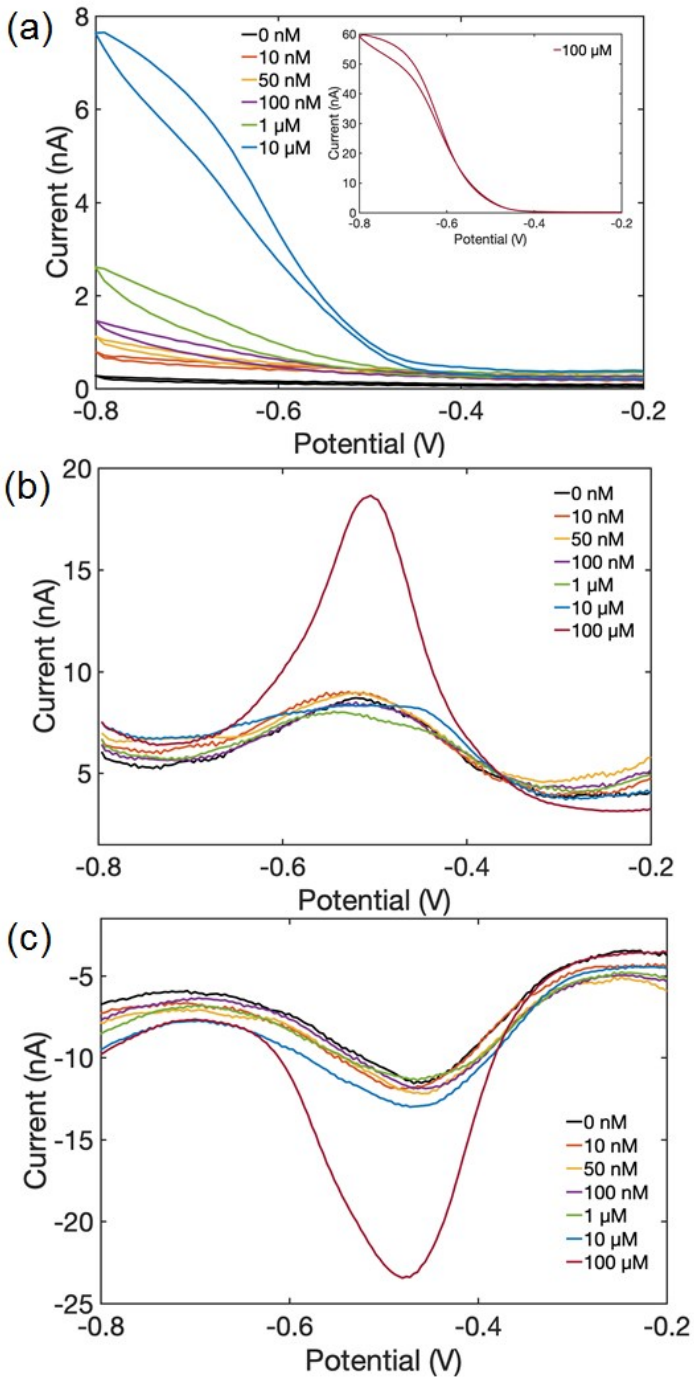

Figure S5. (a) Representative anodic GC mode current responses for PCN taken from TE. (b,c) Representative oxidative (b) and reductive (c) SW voltammograms as a function of PCN concentration.

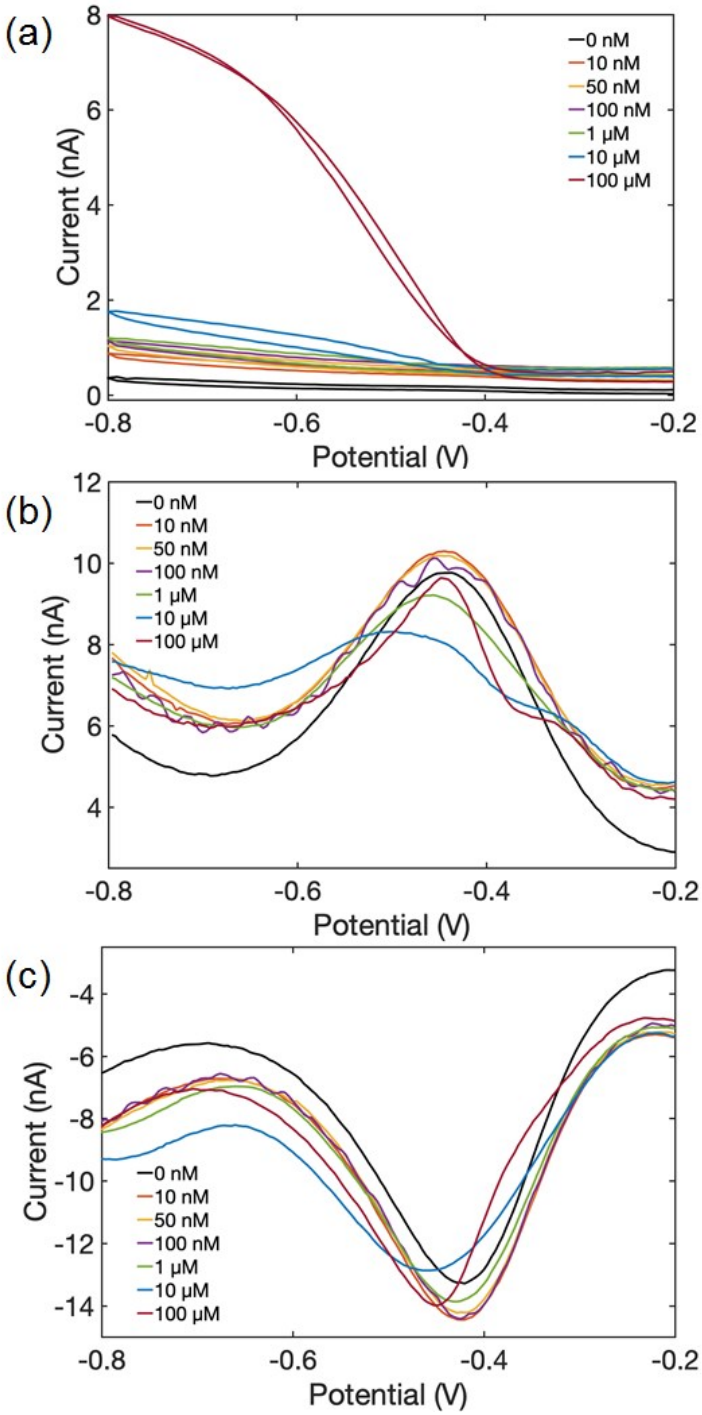

Figure S6. (a) Representative anodic GC mode current responses for PCA taken from TE. (b,c) Representative oxidative (b) and reductive (c) SW voltammograms as a function of PCA concentration.

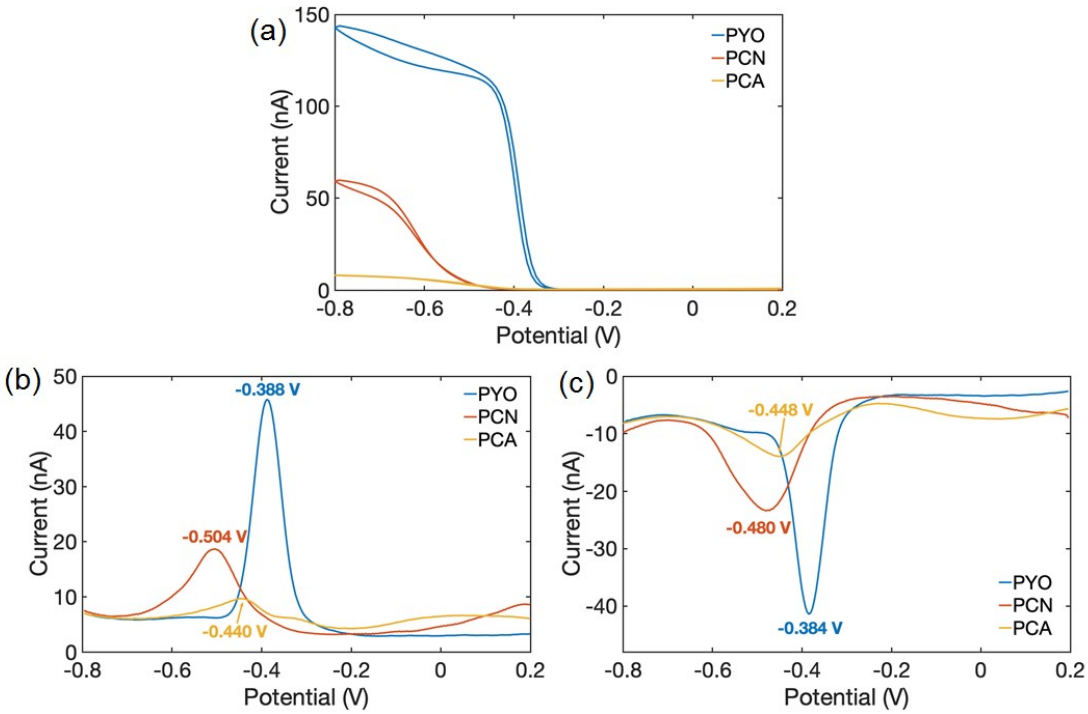

Figure S7. (a) Anodic GC mode voltammograms. (b,c) Oxidative (b) and reductive (c) SW voltammograms. All voltammetric responses were obtained at each 100 μM of PYO, PCN, and PCA solutions.

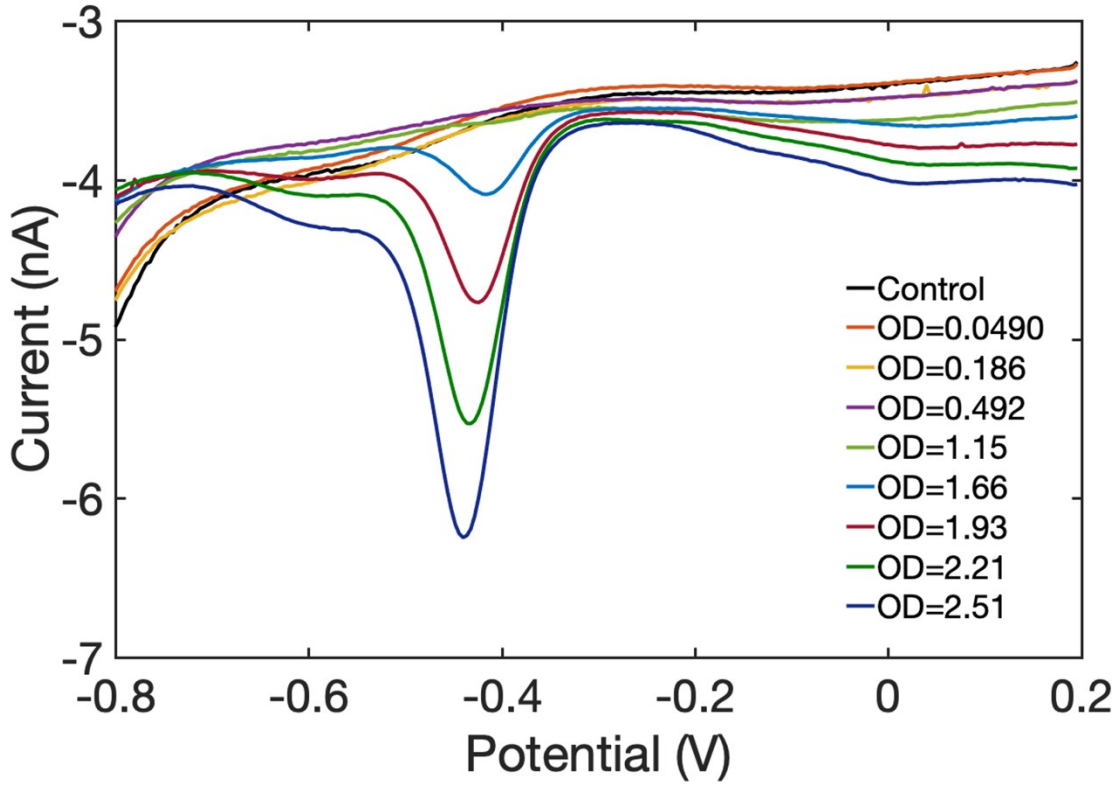

Figure S8. Reductive SW voltammograms measured in *P. aeruginosa* (PA14 *wt*) grown in LB medium to increasing OD values (increasing growth time) on NEAs. OD values above 0.8 should be considered approximate due to multiple scattering effects.

Figure S9. Stationary phase of 10 h-inoculated *P. aeruginosa* (PA14 *wt*) cultured in LB medium, which exhibits a blue-green color due to the production of PYO.

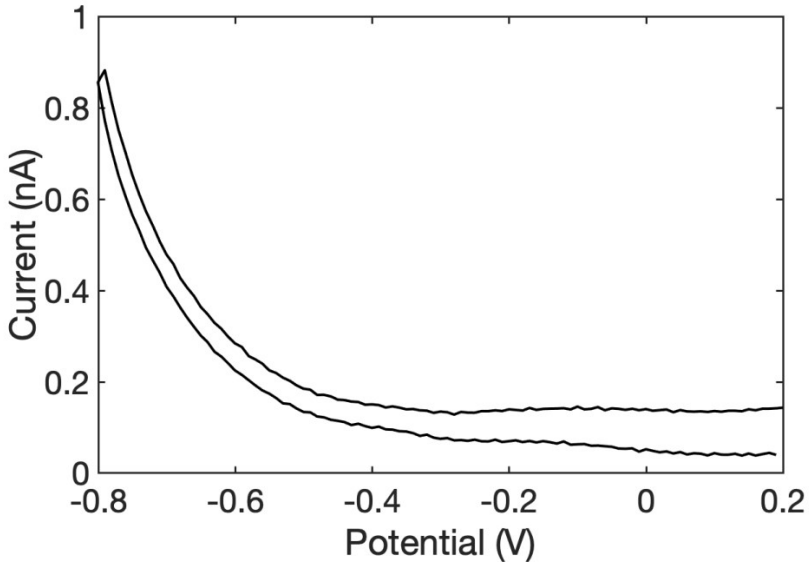

Figure S10. Anodic GC voltammogram of a nanopore electrode surface cleaned by several sequential CV scans in LB medium. The NEA device, which was previously used in high-concentration cellular culture, was washed with copious amounts of DI water prior to scanning.

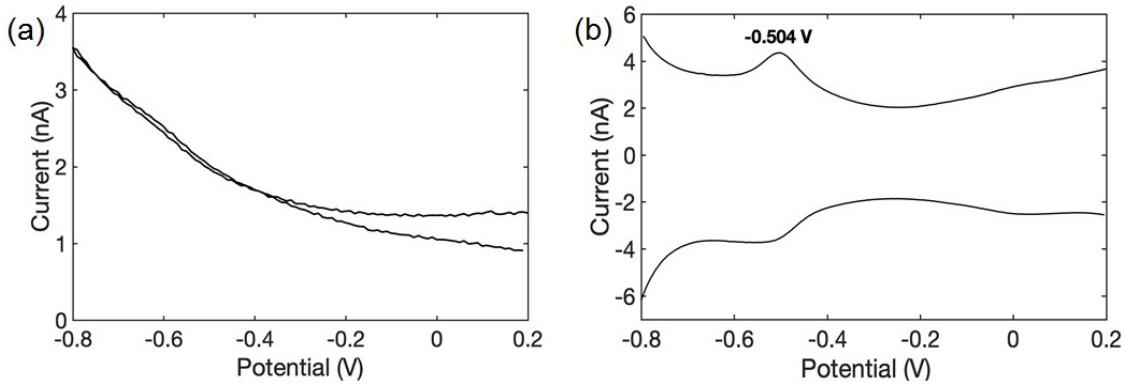

Figure S11. (a) GC mode cyclic-voltammogram and (b) oxidative and reductive SW voltammograms of the *P. aeruginosa* Δ*phzMS* mutant strain, which produces only PCA and PCN. All samples grown in LB medium to an apparent OD_{600} = 2.2.

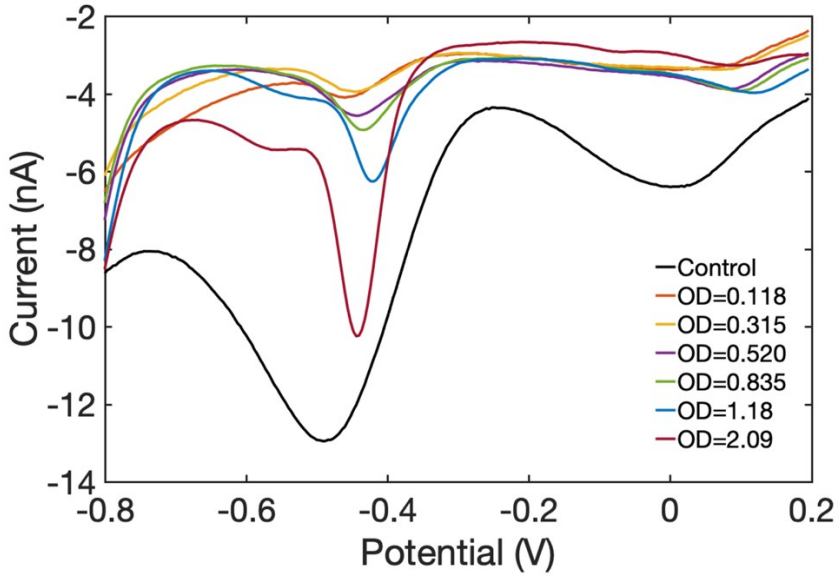

Figure S12. Reductive SW voltammograms measured in *P. aeruginosa* (PA14 *wt*) grown in FAB minimal medium to increasing OD values (increasing growth time). OD values above 0.8 should be considered approximate due to multiple scattering effects.

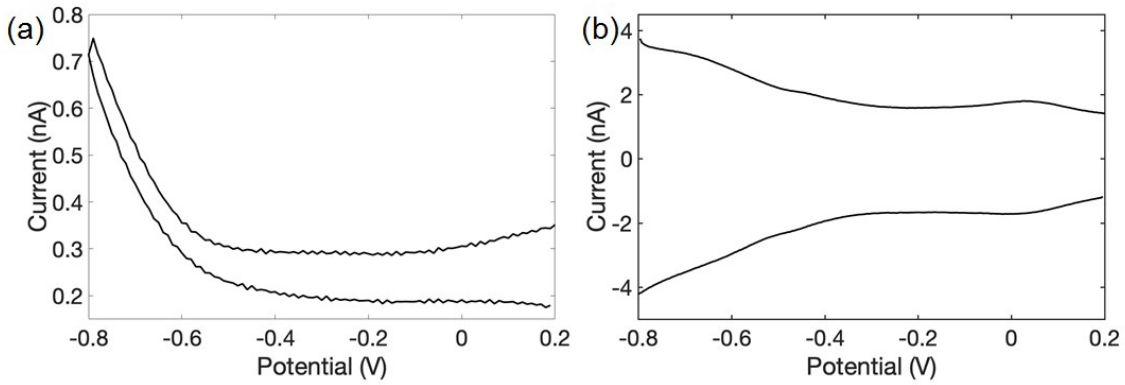

Figure S13. (a) Anodic GC voltammogram and (b) SW voltammograms obtained from *P. aeruginosa* Δ*phz* grown in FAB minimal medium (apparent OD_{600} = 2.5). The absence of distinct peaks indicates the absence of phenazine species.

LB		FAB	
Incubation Time (h)	OD_{600}	Incubation Time (h)	OD_{600}
3	0.0490	8	0.118
4	0.186	10	0.315
5	0.492	12	0.520
6	1.15	14	0.835
7	1.66	16	1.18
8	1.93	28	2.09
9	2.21	-	-
10	2.51	-	-

Table S1. Optical density values at OD = 600 nm measured with increasing incubation time of *P. aeruginosa* cultured in LB and FAB media.