

Electronic Supplementary Information

Respiratory Au nucleation and microelectrode techniques reveal key features of bacterial conductive matrixes.

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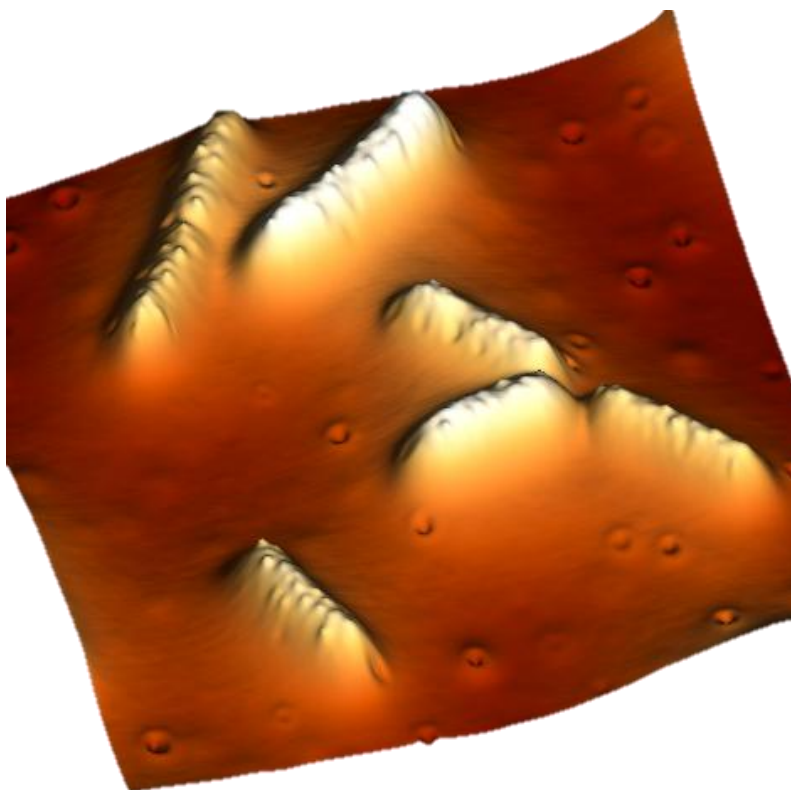


Figure S1. Topographic AFM images of *G. sulfurreducens* cells grown in batch under fumarate limitation acquired by non-contact mode. Image of individual cells mounted over a HPG (Highly oriented Pyrolytic Graphite) electrode is shown. Image courtesy of Dr. Abraham Esteve-Nuñez and Dr. Celia Rogero, Madrid Institute for Advance Studies (IMDEA-Aguas), Spain.

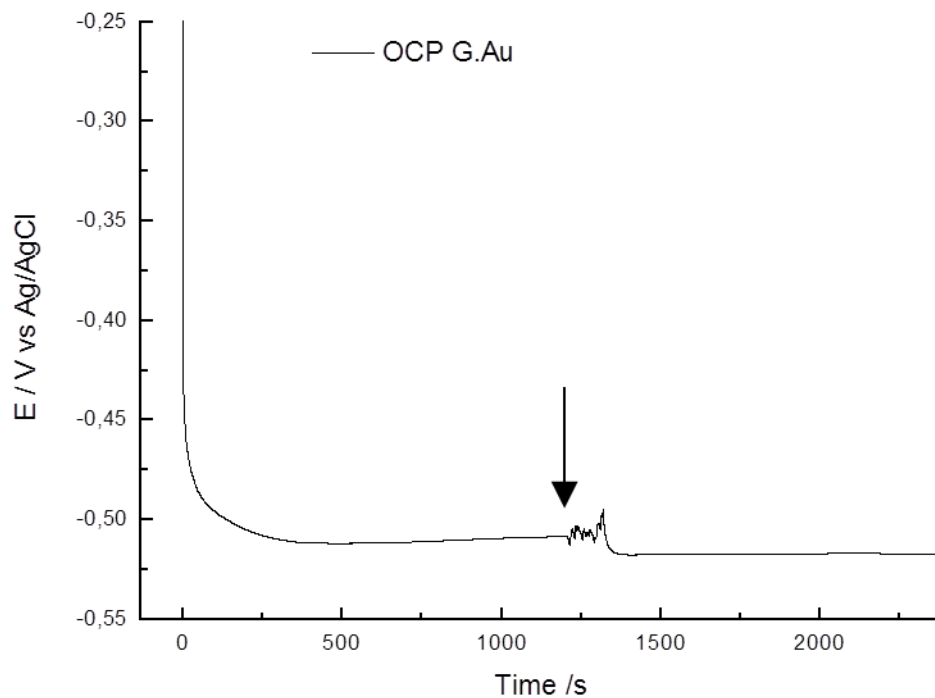


Figure S2. Representative Open Circuit Potential evolution after interrupting polarization and during incubation of *G. sulfurreducens* electroactive biofilm with 200 μ M AuHCl₄. The arrow indicates the moment at which AuHCl₄ was added to the reactor. OCP conditions were kept for a period of time enough to completely reduce added Au(III).

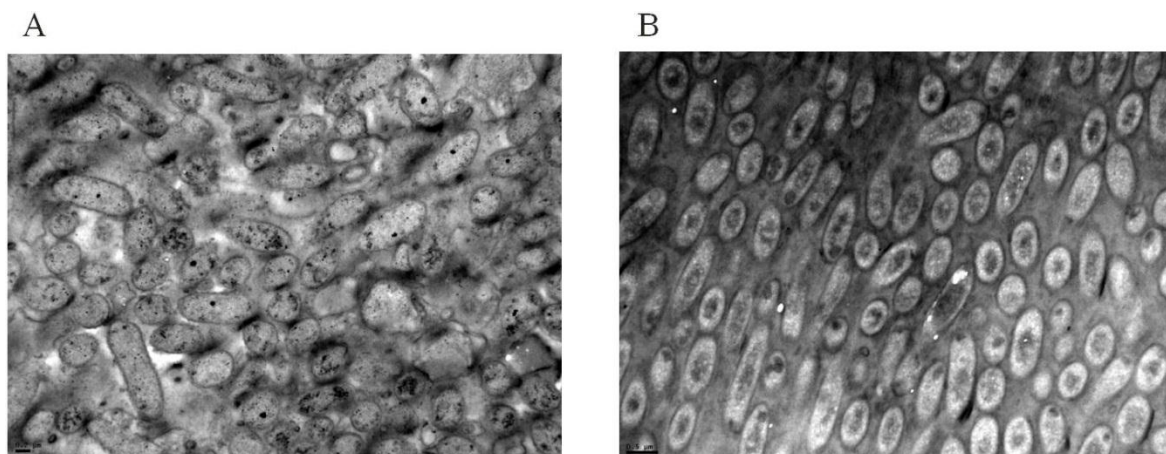


Figure S3. TEM images of ultrathin sections of *G. sulfurreducens* electroactive biofilm incubated with AuHCl₄ (A) (scale bar: 0,2 μ m) or not (B) (scale bar: 0,5 μ m), obtained at 20000x magnification.

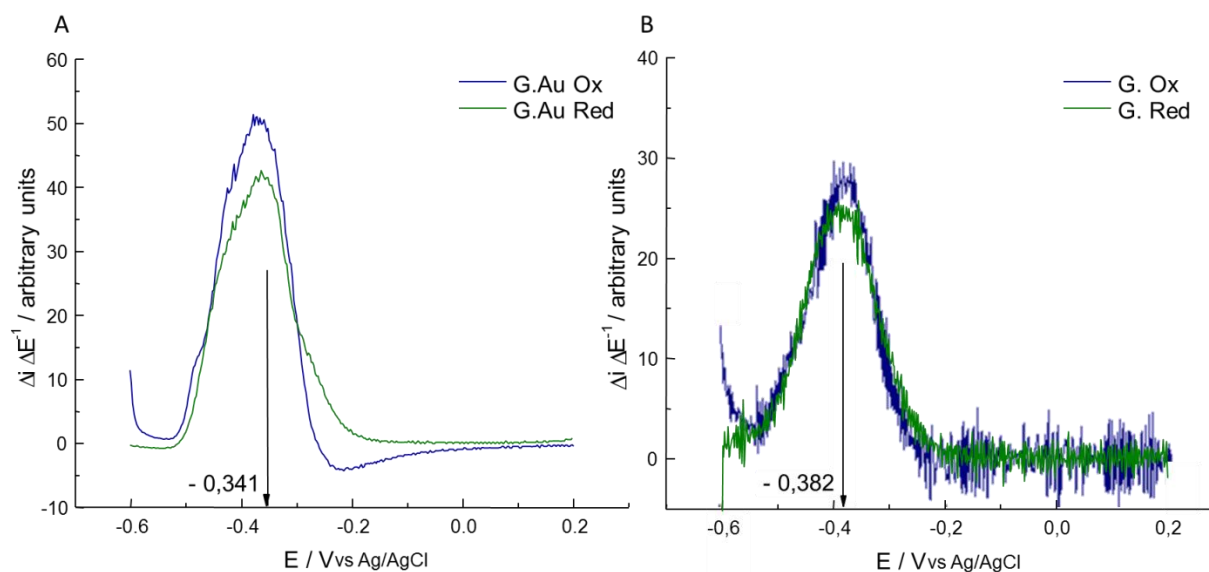


Figure S4. First derivative of voltammograms obtained from *G. sulfurreducens* electroactive biofilms incubated (A) or not (B) with AuHCl_4 .

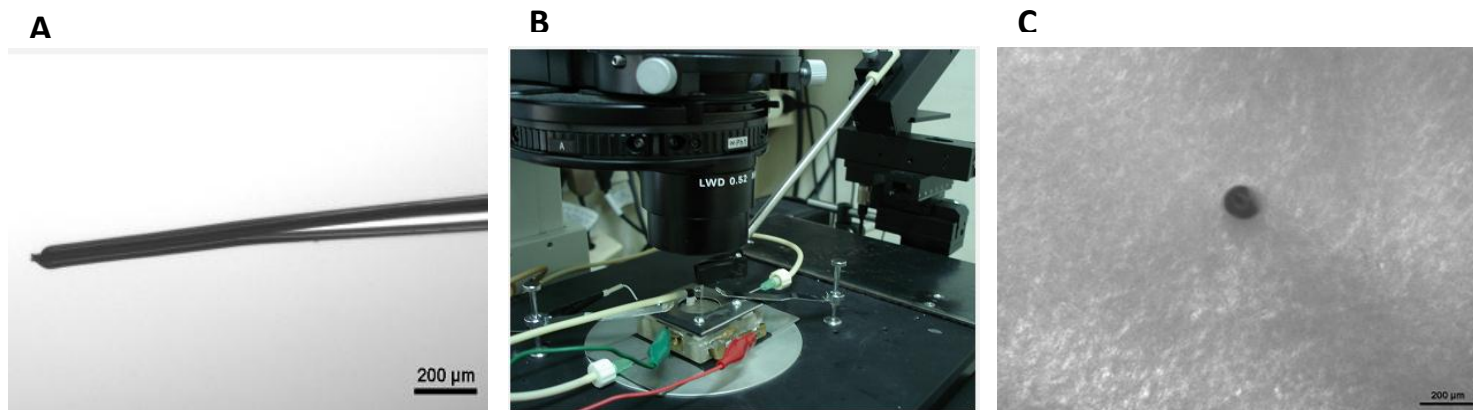


Figure S5. Handmade microelectrode was design using 20 μm diameter platinum wire inside a glass micropipette (A) (scale bar 200 μm). Microelectrode was prepared by heating the glass micropipette to form a sealed filament. Image (B) depicts experimental setup used where the electrochemical cell combined with microelectrode micromanipulator were mounted onto a phase contrast inverted microscope while (C) shows the biofilm with the microelectrode platinum tip positioned at 100 μm from the electrode surface (scale bar 200 μm).

	J_{\max}/Am^{-2}				Mean	SD
	1	2	3	4		
G.Au	9,16	9,76	7,31	7,4	8,4075	1,24031
G.	5,45	4,99	5,02	4,93	5,0975	0,23796

Table S1. Maximum current density (J_{\max}) registered from 4 different replicates of electro-active *Geobacter* biofilms growing over polarized gold electrode exposed (G.Au) or not (G.) to 200 μM AuHCl_4 .