

**Table S1** Summary of alpha diversity of microbial communities in anodic and cathodic biofilms, planktonic culture, and inoculum

Sample	Sequences	Subsample	Observed OTUs	Shannon Index	Evenness
Anodic biofilm	11,586	8,500	1,242 ± 14	5.9	0.83
Cathodic biofilm	14,308	8,500	2,200 ± 25	6.5	0.85
Inoculum	8,615	8,500	1,549 ± 2	6.2	0.84
Planktonic culture	8,683	8,500	1,085 ± 4	5.7	0.82

**Table S2** Distribution of sulfate and sulfur reducing bacteria observed in anodic and cathodic biofilms, planktonic culture, and inoculum (%)

Genus	Anodic biofilm	Cathodic biofilm	Planktonic culture	Inoculum
<i>Desulfobulbus</i>	11.00	7.84	18.96	0.03
<i>Desulfomicrobium</i>	2.68	0.31	0.55	0.21
<i>Desulforhabdus</i>	1.70	0.03	0.50	0.23
<i>Desulfovibrio</i>	3.55	1.33	4.45	0.05
<i>Geobacter</i>	5.29	0.18	0.24	0.01
<i>The others</i>	0.35	0.20	0.14	1.18
Total	24.57	9.89	24.83	1.72