Supporting Information for MS:

A new role for sulfur in arsenic cycling

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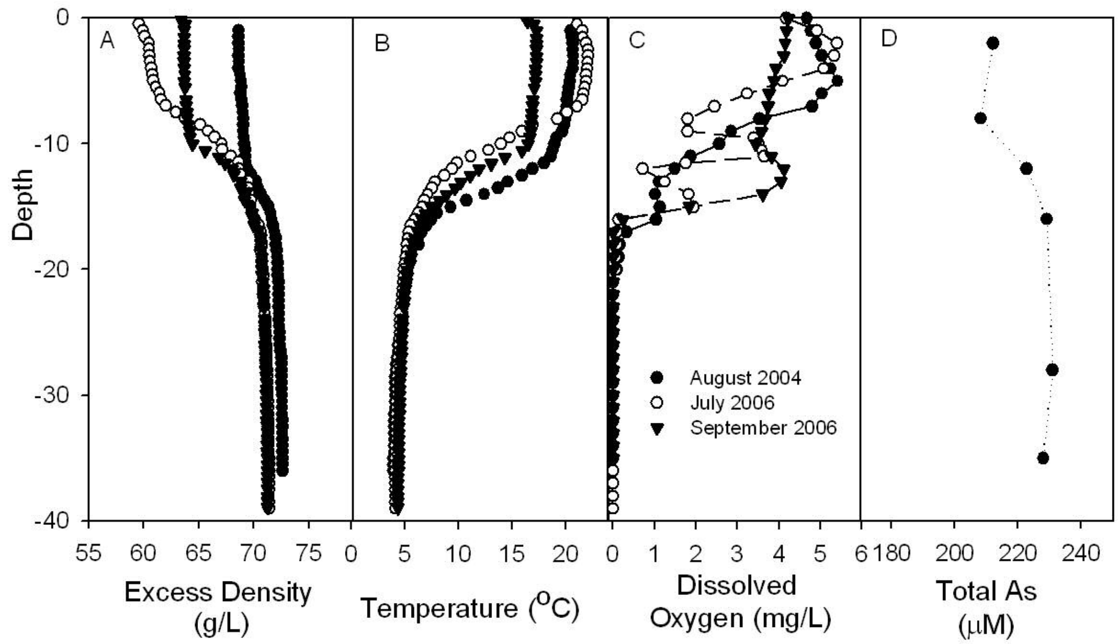
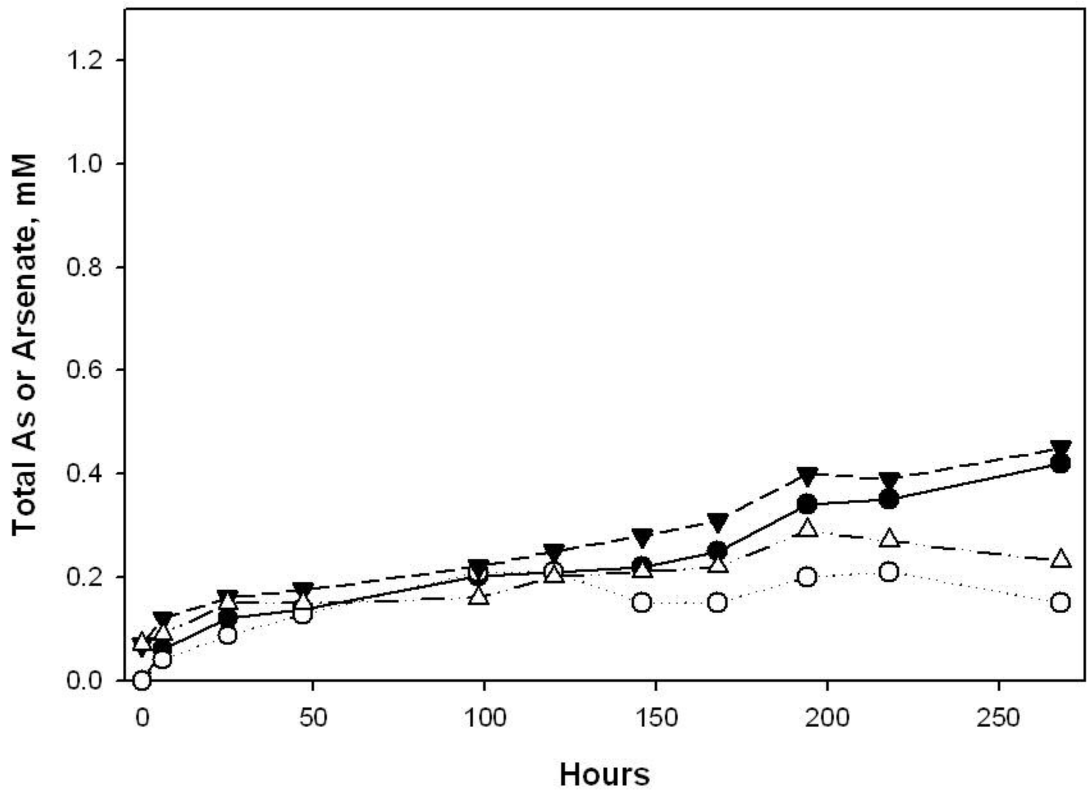
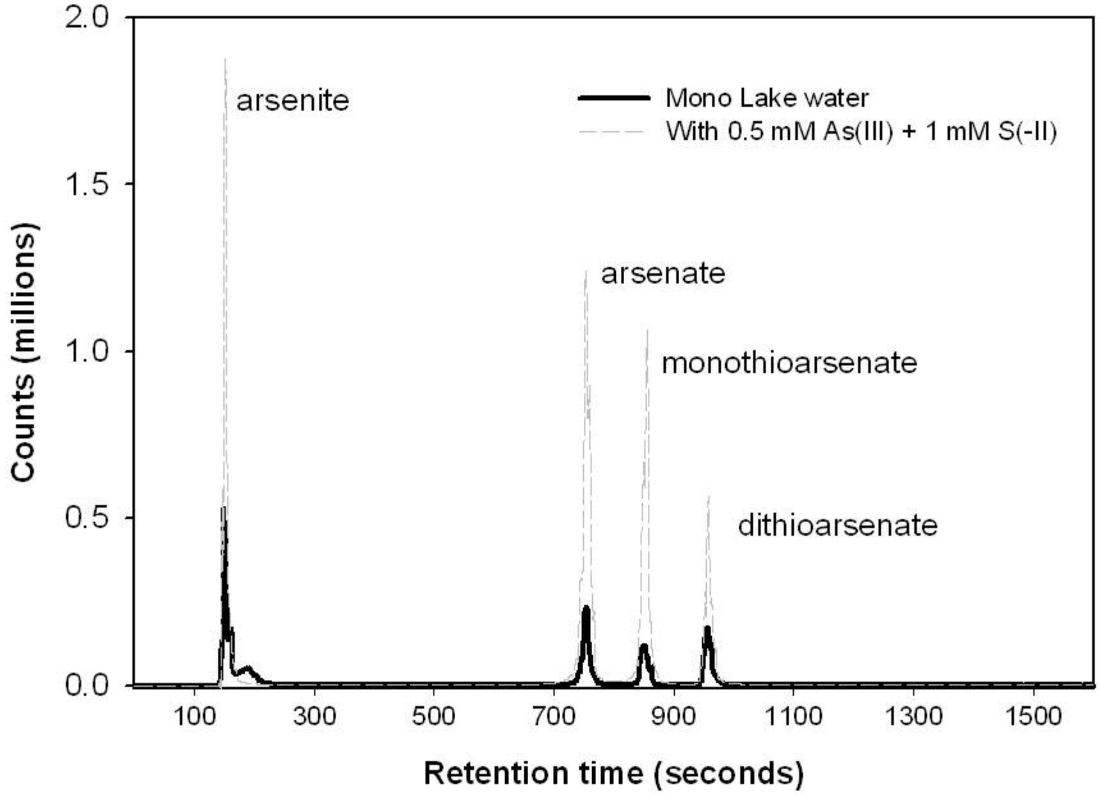


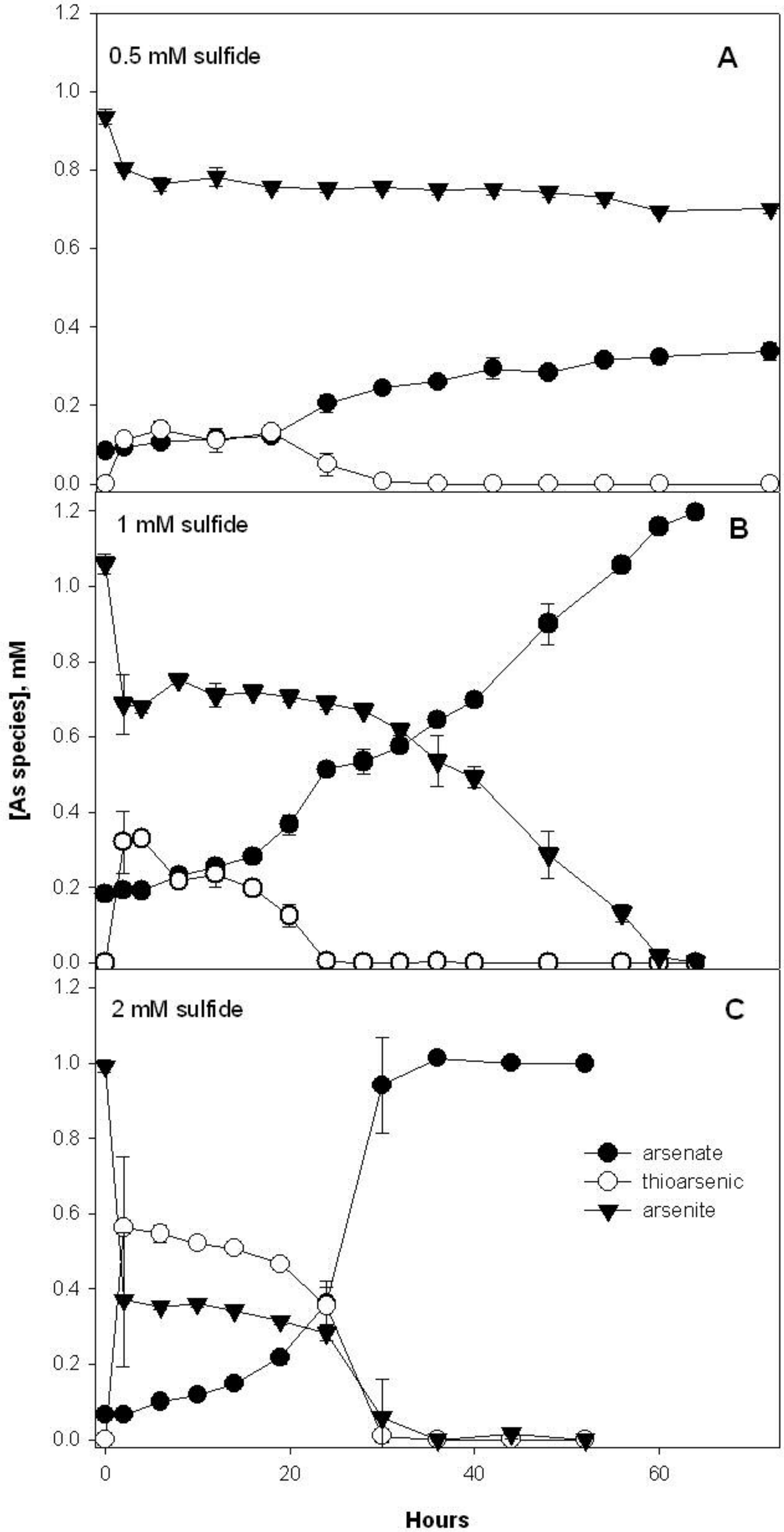
Supporting Figure S1. CTD measurements (excess density and temperature, A and B) and dissolved oxygen concentrations (C) from CTD casts taken in August 2004 (●), July 2006 (○), and September 2006 (▼). A set of samples from August 2004 was analyzed for total arsenic (●, D).



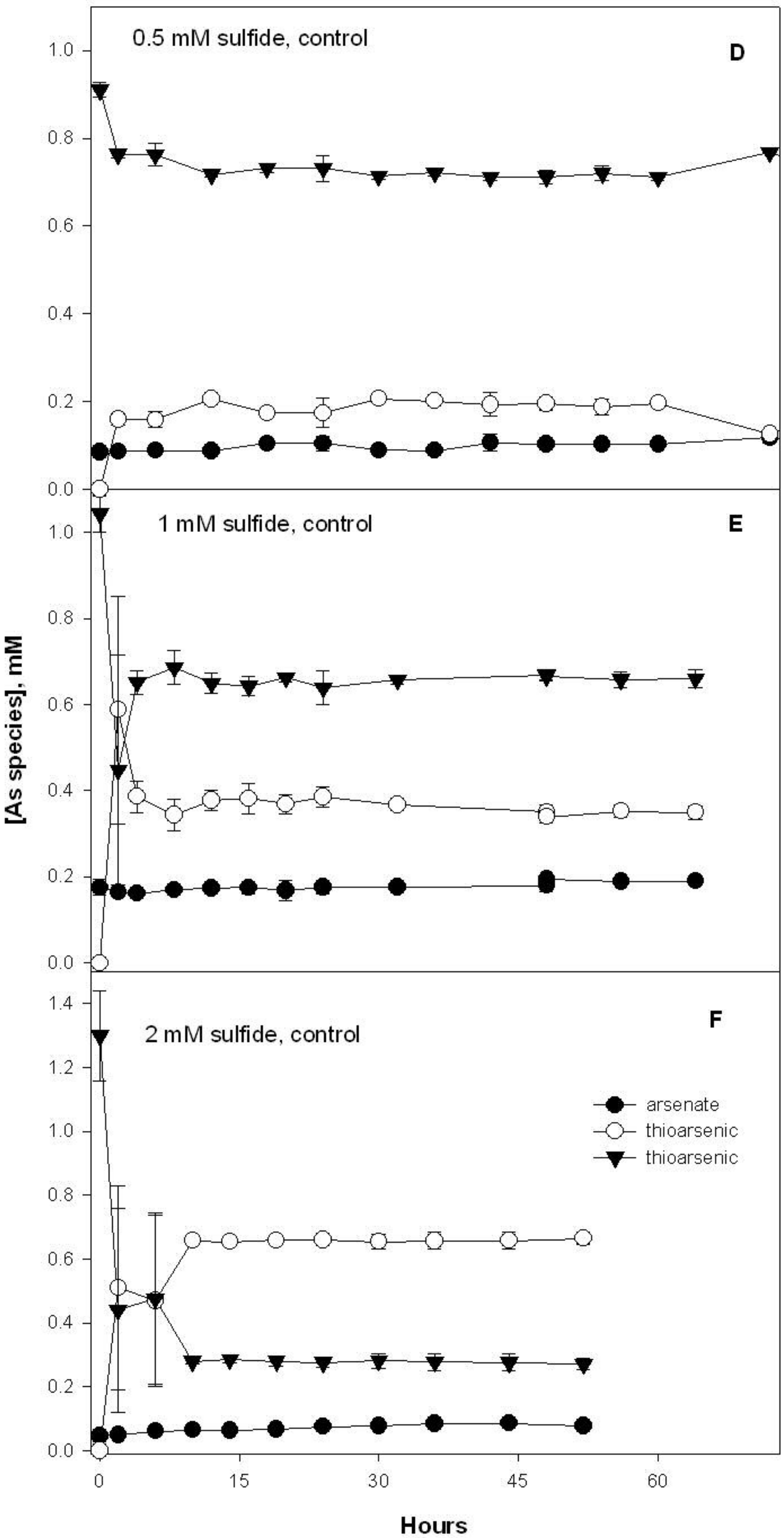
Supporting Figure S2. Comparison of arsenate production in Mono Lake water (MLW) or artificial Mono Lake water (AMLW) medium controls amended with 2 mM sulfide and 1 mM arsenite with or without formalin. Symbols: MLW, filtered (∆); MLW with formalin (▼); AMLW, filtered (○); AMLW with formalin (●).



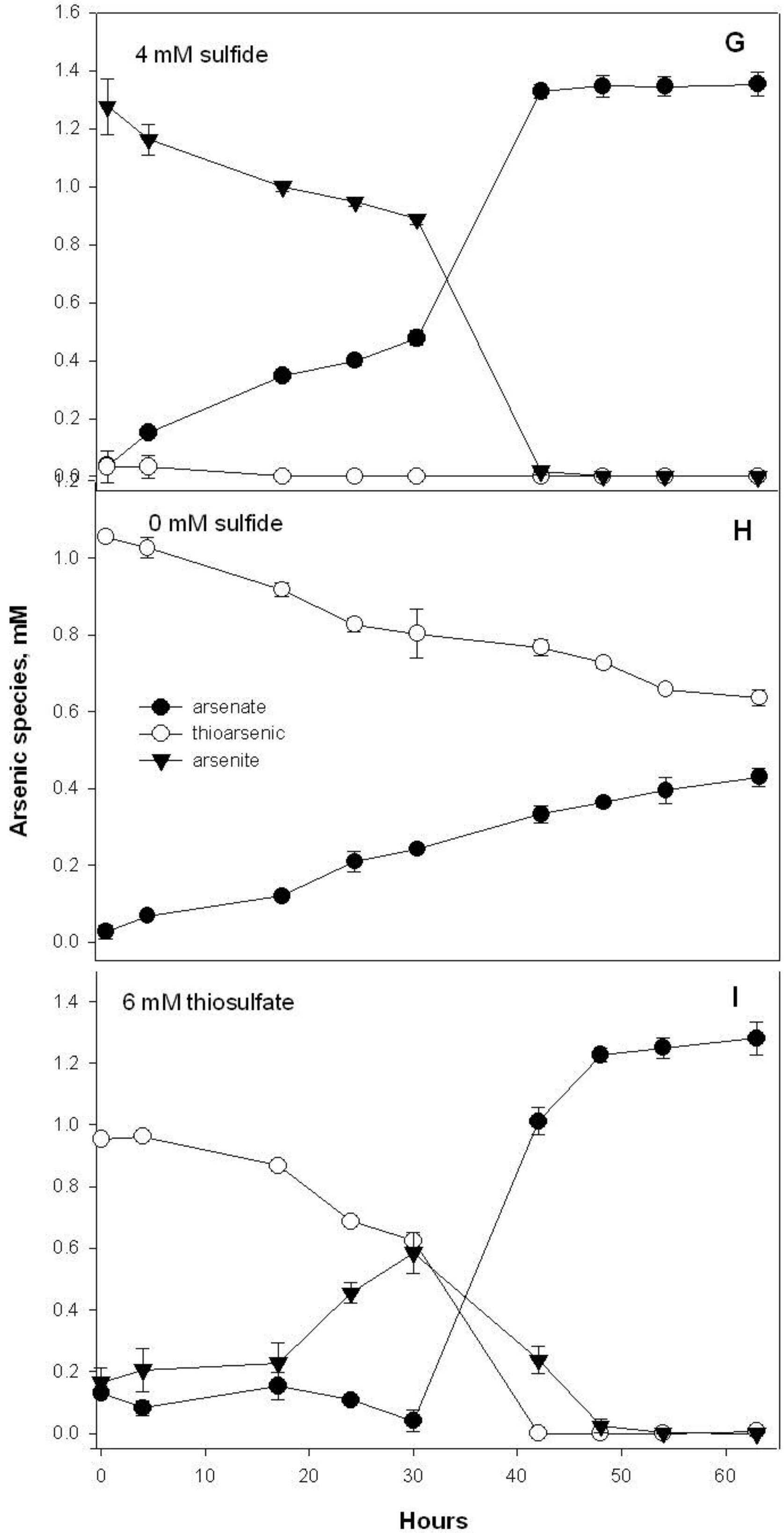
Supporting Figure S3. IC-ICP-MS chromatograms of an anoxic Mono Lake water sample (35m, September 2006; —) and the first sample from the second simulated mixing experiment (---).



0.5 mM sulfide
A
1 mM sulfide
B
2 mM sulfide
C
[As species], mM
Hours
arsenate
thioarsenic
arsenite
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60

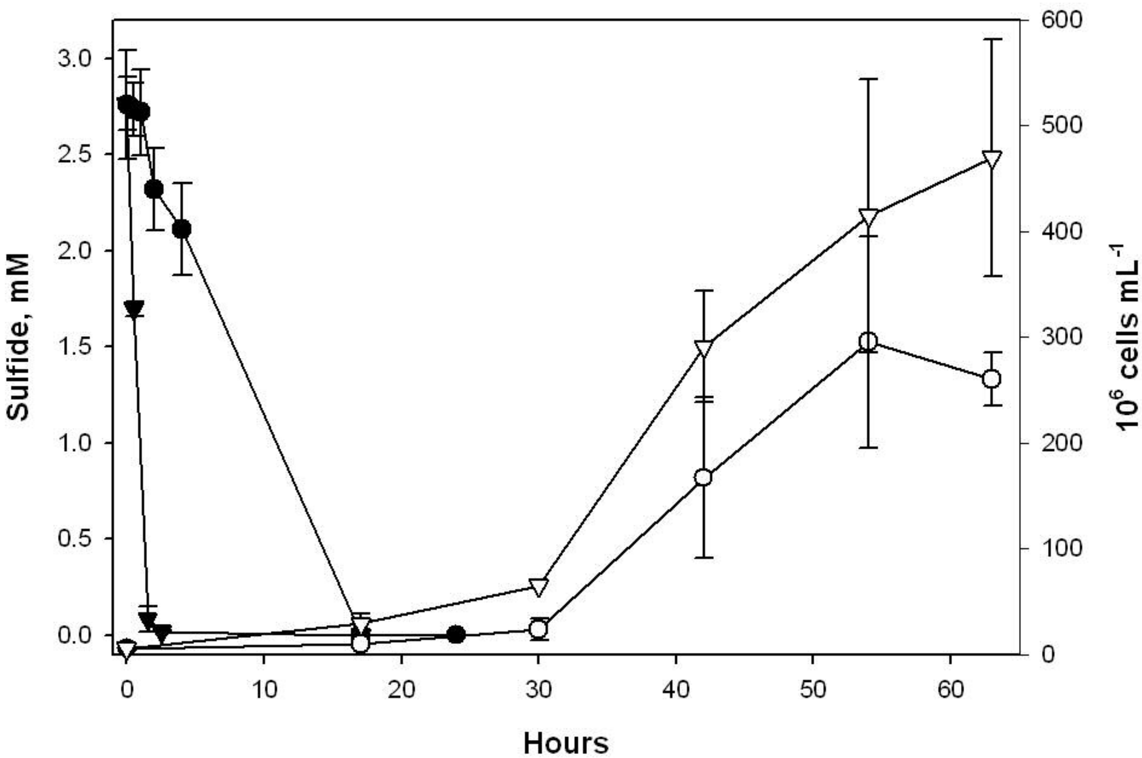


0.5 mM sulfide, control
D
1 mM sulfide, control
E
2 mM sulfide, control
F
arsenate
thioarsenic
thioarsenic
[As species], mM
Hours



4 mM sulfide
G
0 mM sulfide
H
6 mM thiosulfate
I
arsenate
thioarsenic
arsenite
Arsenic species, mM
Hours

Supporting Figure S4. Arsenic speciation in enrichment culture experiments. Arsenate (●) and arsenite (▼) were measured by HPLC and thioarsenic (○) was determined by difference. Artificial Mono Lake water was amended with 1 mM arsenite and A) 0.5 mM sulfide and live inoculum, B) 1 mM sulfide and live inoculum, C) 2 mM sulfide and live inoculum, D) 0.5 mM sulfide (sterile control), E) 1 mM sulfide (sterile control), F) 2 mM sulfide (sterile control), G) 4 mM sulfide, H) no sulfide, or I) 6 mM thiosulfate.



Supporting Figure S5. Sulfide was depleted rapidly (<24 hours) in the 4 mM sulfide + 1 mM arsenite treatment (As+S, ▼) and in the 4 mM sulfide only treatment (S, ●). Cell density in the As+S (Δ) and S (○) treatments increased significantly after sulfide was not detected, likely due to oxidation of polysulfides (S_5^{2-}), thiosulfate, or sulfite. Experiments were conducted in artificial Mono Lake water with a consortium of sulfoxidizing bacteria.

Supporting Table S1. Description of clones from an arsenite and sulfide enrichment culture.

Sequence (Accession number)	Closest sequence match (% similarity)	Closest cultured relative (% similarity)	Number of clones represented by sequence
MLAsHS-clone506-1 (EF643362)	Uncultured gamma proteobacterium clone ML615J-17 (99%)	*Thioalkalivibrio jannaschii* (98%)	5
MLAsHS-clone506-2 (EF643363)	Uncultured gamma proteobacterium clone ML615J-17 (99%)	*Thioalkalivibrio versutus* (97%)	2
MLAsHS-clone506-3 (EF643364)	*Idiomarina* sp. G-R2A15 (99%)	*Idiomarina salinae* strain ISL-52 (96%)	1
MLAsHS-clone506-8 (EF643369)	Uncultured gamma proteobacterium clone ML623J-18 (96%)	*Thioalkalivibrio nitratis* (95%)	1
MLAsHS-clone506-10 (EF643371)	*Arhodomonas* sp. EL-201 (98%)	*Saccharospirillum impatiens* (98%)	1