Supplemental Table 1: Summary of Mo Concentration Measurements

	Initial Mo$_{aq}$ (µM)	Initial Sulfide (µM)	Run #1 ICPMS Mo (µM)	Run #2 ICPMS Mo (µM)	AVG ICPMS Mo (µM)	±2SD	MC-ICPMS Mo ppm	Run #3 MC-ICPMS Mo (µM)	MC-ICPMS Mo ppm	Run #4 MC-ICPMS Mo (µM)	AVG MC-ICPMS Mo (µM)	±2SD	TOTAL AVG Mo$_{aq}$ (µM)	±2SD
EXPERIMENT SERIES A	**0.26**	**0.00**												
A-START			0.31				0.03	0.30	0.03	0.30	0.30	0.002	0.30	0.02
A1			0.30				0.03	0.28	0.03	0.28	0.28	0.002	0.29	0.02
A2			0.30	0.28	0.29	0.04	0.03	0.26	0.03	0.26	0.26	0.001	0.28	0.04
A3			0.29				0.02	0.22	0.02	0.22	0.22	0.001	0.24	0.07
A4			0.26	0.24	0.25	0.03	0.02	0.18					0.23	0.08
A5			0.11										0.11	
EXPERIMENT SERIES 1	**99.1**	**0**												
1 START			56.7	51.5	54	7	5.6	58.4	5.6	58.5	58	0	56	7
1A			45.5				4.6	48.0	4.5	47.2	48	1	47	3
1B			49.3				5.1	52.9	5.1	52.7	53	0	52	4
1C			47.9	44.3	46	5	4.5	47.4					46	4
1D			43.7				4.6	47.9	4.6	48.3	48	1	47	5
1E			39.7	39.6	40	0	4.1	43.2					41	4
1F			42.7				4.1	42.6	4.1	42.3	42	0	43	0
EXPERIMENT SERIES 2	**102.2**	**0**												
2 START			87.0	82.2	85	7	8.1	84.3					84	5
2A			84.2				8.2	85.3					85	1
2B			82.0	83.1	83	2	8.0	83.3					83	1
2C			83.1	89.3	86	9	8.1	84.1					85	7
2D							7.9	82.7	9.4	98.1	90	22	90	22
2E							8.0	83.7					84	
2F			80.5				6.2	64.2					72	23
EXPERIMENT SERIES 3	**102.6**	**~ 420**												
3 START			36.0	32.9	34	4	4.8	50.4	4.5	47.1	49	5	42	17
3A			19.1	18.4	19	1	2.4	24.7	2.4	24.5	25	0	22	7
3B			19.6				3.0	31.5					26	17
3C			18.9	20.7	20	3	2.9	30.1					23	12
3D			17.1				2.6	26.6	2.4	25.1	26	2	23	10
3E			18.3				2.3	26.6					22	12
3F			17.2				2.5	26.6	2.5	26.0	26	1	23	10
EXPERIMENT SERIES 4	**98.4**	**~ 700**												
4 START			85.6	81.7	84	5	7.5	78.1					82	7
4A			83.4				8.5	88.8					86	8
4B			84.2				8.5	88.6					86	6
4C			84.6	89.4	87	7	8.4	87.6	9.8	101.9	95	20	91	15
4D			84.4				8.4	87.8					86	5
4E			84.3				8.4	87.7					86	5
4F			90.2				9.4	97.9					94	11

Runs #1 and #2 were measured by ICPMS on independently prepared replicate samples. Runs #3 and #4 were measured by MC-ICPMS on independently prepared replicate samples. Average Mo$_{aq}$ values and 2-SD errors reported in Table 1 and used for all % Mo Loss calculations.

Supplemental Table 2. Summary of Mo Isotope Measurements

	δ^{98}Mo	±2SD	δ^{98}Mo	±2SD	AVG Mo$_{aq}$ δ^{98}Mo	±2SD
EXPERIMENT SERIES A						
A-START	-0.1		-0.1		**-0.1**	0.1
A1	0.0				**0.0**	
A2	0.2		0.0		**0.1**	0.2
A3	0.4		0.4		**0.4**	0.0
A4	0.6				**0.6**	
A5	na					
EXPERIMENT SERIES 1						
1 START	0.2		0.3		**0.2**	0.2
1A	0.5		0.5		**0.5**	0.0
1B	0.4	0.0	0.3		**0.4**	0.0
1C	0.3				**0.3**	
1D	0.2		0.3		**0.2**	0.1
1E	0.3				**0.3**	
1F	0.4		0.4		**0.4**	0.1
EXPERIMENT SERIES 2						
2 START	0.1				**0.1**	
2A	0.0				**0.0**	
2B	-0.1				**-0.1**	
2C	0.0				**0.0**	
2D	0.0		-0.2		**-0.1**	0.2
2E	0.0				**0.0**	
2F	0.2				**0.2**	
EXPERIMENT SERIES 3						
3 START	0.6		0.4		**0.5**	0.2
3A	1.0	0.1	1.2		**1.1**	0.2
3B	1.3				**1.3**	
3C	1.4				**1.4**	
3D	1.5		1.2		**1.3**	0.3
3E	1.4				**1.4**	
3F	1.0		1.2		**1.1**	0.3
EXPERIMENT SERIES 4						
4 START	0.0				**0.0**	
4A	0.0				**0.0**	
4B	-0.1				**-0.1**	
4C	0.2		-0.2		**0.0**	0.5
4D	0.0				**0.0**	
4E	-0.1				**-0.1**	
4F	-0.1				**-0.1**	

Runs #1 and #2 measured by MC-ICPMS on independently prepared replicate samples. For thes same samples, the Mo concentrations determined by MC-ICPMS are listed in Supplemental Table 1 (Runs #3 and #4). All errors are 2SD for replicate analyses when available.

Supplemental Table 3. Summary of Replicate Mo Standard Measurements

MC-ICPMS Mo (ppm)	Mo (μM)	RUN #1 δ^{98}Mo	2-SE	RUN #2 δ^{98}Mo	2-SE	RUN #3 δ^{98}Mo	2-SE	AVG δ^{98}Mo	2-SD
10.24	107	0.0	0.1					0.0	
10.22	107	0.0	0.0					0.0	
9.79	102	0.0	0.0					0.0	
10.23	107	0.2	0.0					0.2	
10.21	106	0.2	0.1	0.2	0.1	0.0	0.0	0.1	0.2
10.12	105	-0.2	0.1					-0.2	
10.20	106	0.0	0.0					0.0	
10.20	106	0.1	0.0					0.1	
9.45	99	-0.3	0.1	0.0	0.0			-0.1	0.4
9.45	99	0.1	0.0					0.1	
9.48	99	0.2	0.0					0.2	
10.68	111	-0.1	0.1					-0.1	
11.48	120	0.2	0.0					0.2	
11.50	120	0.2	0.0					0.2	
AVG 10.2	107							0.0	
2-SD 1.3	13							0.2	

All samples listed are separate aliquots of a 10 ppm (104 μM) Mo standard solution (*Claritas PPT* ICPMS Mo Standard, Lot #CL2-44MO). For these samples, Runs #1, #2, and #3 represent separate Mo isotope analyses of the same individual aliquot.