
Reading data base.

SOLUTION_MASTER_SPECIES
SOLUTION_SPECIES
PHASES
EXCHANGE_MASTER_SPECIES
EXCHANGE_SPECIES
SURFACE_MASTER_SPECIES
SURFACE_SPECIES
RATES
END

Reading input data for simulation 1.

DATABASE C:\Program Files (x86)\USGS\Phreeqc Interactive 2.18.5570\database
\wateq4f.dat

SOLUTION 1 UGA1

temp	25
pH	4.44
pe	12
redox	pe
units	mg/l
density	1
Cl	51.73
S(6)	261.82
Al	1.14
As	0.01
Ca	35.55
Cu	0.13
Fe	5.48
K	25.35
Mg	3.69
Mn	5.09
Na	18.1
Zn	0.56
C(4)	0
N(5)	50.06
water	1 # kg

SOLUTION 2 UGA2

temp	25
pH	2.46
pe	12
redox	pe
units	mg/l
density	1
Cl	35.56
S(6)	1972
Al	19.29
As	0.68
Ca	33.94
Cu	51.26
Fe	407.65
K	1.44
Mg	7.37
Mn	23.20
Na	8.26
Zn	2.8

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C(4)      0.0
N(5)      48.65
water     1 # kg
SOLUTION 3 UGA3
temp      25
pH        4.10
pe        12
redox     pe
units     mg/l
density   1
Cl        33.72
S(6)      636.24
Al        14.93
As        5.51
Ca        69.45
Cu        42.76
Fe        130.06
K         0.00
Mg        6.39
Mn        34.80
Na        8.90
Zn        0.78
C(4)      0.0
N(5)      44.39
water     1 # kg

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SOLUTION 4 UGA4
temp      25
pH        3.36
pe        12
redox     pe
units     mg/l
density   1
Cl        61.60
S(6)      2301.59
Al        91.15
As        18.81
Ca        828.48
Cu        80.57
Fe        299.63
K         292.40
Mg        77.66
Mn        34.67
Na        112.32
Zn        82.01
C(4)      0
N(5)      85.69
water     1 # kg

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MIX 1
1      0.6
2      0.25
3      0.1
4      0.05

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SELECTED_OUTPUT
file      MISDAMFLUJO1
ph        true
percent_error true
totals    Al As Cu Fe Mg Mn Zn

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Beginning of initial solution calculations.

Initial solution 1. UGA1

-----Solution composition-----

Elements	Molality	Moles
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Al	4.227e-005	4.227e-005
As	1.335e-007	1.335e-007
Ca	8.874e-004	8.874e-004
Cl	1.460e-003	1.460e-003
Cu	2.047e-006	2.047e-006
Fe	9.817e-005	9.817e-005
K	6.486e-004	6.486e-004
Mg	1.518e-004	1.518e-004
Mn	9.269e-005	9.269e-005
N(5)	3.576e-003	3.576e-003
Na	7.877e-004	7.877e-004
S(6)	2.727e-003	2.727e-003
Zn	8.571e-006	8.571e-006

-----Description of solution-----

pH	=	4.440
pe	=	12.000
Activity of water	=	1.000
Ionic strength	=	1.021e-002
Mass of water (kg)	=	1.000e+000
Total alkalinity (eq/kg)	=	-5.812e-005
Total carbon (mol/kg)	=	0.000e+000
Total CO2 (mol/kg)	=	0.000e+000
Temperature (deg C)	=	25.000
Electrical balance (eq)	=	-6.484e-003
Percent error, 100*(Cat- An)/(Cat+ An)	=	-48.02
Iterations	=	4
Total H	=	1.110127e+002
Total O	=	5.552803e+001

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma
H+	3.978e-005	3.631e-005	-4.400	-4.440	-0.040
OH-	3.059e-010	2.757e-010	-9.514	-9.560	-0.045
H2O	5.551e+001	9.998e-001	1.744	-0.000	0.000
Al	4.227e-005				
AlSO4+	2.679e-005	2.414e-005	-4.572	-4.617	-0.045
Al+3	1.185e-005	4.649e-006	-4.926	-5.333	-0.407
AlOH+2	1.928e-006	1.272e-006	-5.715	-5.896	-0.181
Al(SO4)2-	1.391e-006	1.254e-006	-5.857	-5.902	-0.045
Al(OH)2+	3.045e-007	2.745e-007	-6.516	-6.562	-0.045
Al(OH)3	1.111e-009	1.114e-009	-8.954	-8.953	0.001
AlHSO4+2	1.178e-010	7.773e-011	-9.929	-10.109	-0.181
Al(OH)4-	6.413e-011	5.780e-011	-10.193	-10.238	-0.045
As(3)	2.544e-023				
H3AsO3	2.544e-023	2.550e-023	-22.594	-22.593	0.001
H2AsO3-	5.517e-028	4.972e-028	-27.258	-27.303	-0.045
H4AsO3+	5.090e-028	4.587e-028	-27.293	-27.338	-0.045
HAsO3-2	4.142e-038	2.732e-038	-37.383	-37.563	-0.181
AsO3-3	0.000e+000	0.000e+000	-48.417	-48.823	-0.407
As(5)	1.335e-007				
H2AsO4-	1.323e-007	1.193e-007	-6.878	-6.924	-0.045
H3AsO4	8.619e-010	8.639e-010	-9.065	-9.064	0.001
HAsO4-2	3.445e-010	2.272e-010	-9.463	-9.644	-0.181
AsO4-3	3.573e-017	1.401e-017	-16.447	-16.854	-0.407
Ca	8.874e-004				
Ca+2	7.282e-004	4.868e-004	-3.138	-3.313	-0.175
CaSO4	1.592e-004	1.595e-004	-3.798	-3.797	0.001
CaHSO4+	3.765e-008	3.393e-008	-7.424	-7.469	-0.045
CaOH+	2.469e-012	2.225e-012	-11.608	-11.653	-0.045
Cl	1.460e-003				
Cl-	1.459e-003	1.313e-003	-2.836	-2.882	-0.046
MnCl+	3.034e-007	2.734e-007	-6.518	-6.563	-0.045

ZnCl+	1.758e-008	1.584e-008	-7.755	-7.800	-0.045
CuCl+	4.327e-009	3.900e-009	-8.364	-8.409	-0.045
FeCl+2	2.787e-009	1.839e-009	-8.555	-8.735	-0.181
FeCl+	9.765e-010	8.801e-010	-9.010	-9.055	-0.045
MnCl2	1.563e-010	1.567e-010	-9.806	-9.805	0.001
ZnCl2	2.173e-011	2.178e-011	-10.663	-10.662	0.001
FeCl2+	1.197e-011	1.078e-011	-10.922	-10.967	-0.045
ZnOHC1	5.354e-012	5.367e-012	-11.271	-11.270	0.001
CuCl2	2.743e-012	2.750e-012	-11.562	-11.561	0.001
MnCl3-	6.287e-014	5.666e-014	-13.202	-13.247	-0.045
ZnCl3-	3.560e-014	3.208e-014	-13.449	-13.494	-0.045
FeCl3	1.412e-015	1.416e-015	-14.850	-14.849	0.001
CuCl2-	3.503e-016	3.157e-016	-15.456	-15.501	-0.045
ZnCl4-2	3.201e-017	2.111e-017	-16.495	-16.675	-0.181
CuCl3-	1.421e-017	1.281e-017	-16.847	-16.893	-0.045
CuCl3-2	9.958e-019	6.569e-019	-18.002	-18.183	-0.181
CuCl4-2	1.278e-022	8.428e-023	-21.894	-22.074	-0.181
Cu(1)	9.939e-016				
Cu+	6.426e-016	5.791e-016	-15.192	-15.237	-0.045
CuCl2-	3.503e-016	3.157e-016	-15.456	-15.501	-0.045
CuCl3-2	9.958e-019	6.569e-019	-18.002	-18.183	-0.181
Cu(2)	2.047e-006				
Cu+2	1.673e-006	1.103e-006	-5.777	-5.957	-0.181
CuSO4	3.692e-007	3.700e-007	-6.433	-6.432	0.001
CuCl+	4.327e-009	3.900e-009	-8.364	-8.409	-0.045
CuOH+	3.372e-010	3.039e-010	-9.472	-9.517	-0.045
Cu(OH)2	1.744e-011	1.748e-011	-10.758	-10.757	0.001
CuCl2	2.743e-012	2.750e-012	-11.562	-11.561	0.001
Cu2(OH)2+2	6.125e-014	4.041e-014	-13.213	-13.394	-0.181
CuCl3-	1.421e-017	1.281e-017	-16.847	-16.893	-0.045
Cu(OH)3-	3.219e-020	2.901e-020	-19.492	-19.537	-0.045
CuCl4-2	1.278e-022	8.428e-023	-21.894	-22.074	-0.181
Cu(OH)4-2	2.416e-028	1.594e-028	-27.617	-27.798	-0.181
Fe(2)	8.787e-007				
Fe+2	7.361e-007	4.856e-007	-6.133	-6.314	-0.181
FeSO4	1.415e-007	1.418e-007	-6.849	-6.848	0.001
FeCl+	9.765e-010	8.801e-010	-9.010	-9.055	-0.045
FeHSO4+	3.756e-011	3.385e-011	-10.425	-10.470	-0.045
FeOH+	4.692e-012	4.229e-012	-11.329	-11.374	-0.045
Fe(OH)2	9.888e-019	9.911e-019	-18.005	-18.004	0.001
Fe(OH)3-	1.125e-024	1.014e-024	-23.949	-23.994	-0.045
Fe(3)	9.729e-005				
Fe(OH)2+	8.342e-005	7.518e-005	-4.079	-4.124	-0.045
FeOH+2	1.250e-005	8.245e-006	-4.903	-5.084	-0.181
FeSO4+	9.266e-007	8.351e-007	-6.033	-6.078	-0.045
Fe(OH)3	2.661e-007	2.667e-007	-6.575	-6.574	0.001
Fe+3	1.183e-007	4.637e-008	-6.927	-7.334	-0.407
Fe(SO4)2-	3.330e-008	3.001e-008	-7.478	-7.523	-0.045
Fe2(OH)2+4	9.664e-009	1.830e-009	-8.015	-8.738	-0.723
FeCl+2	2.787e-009	1.839e-009	-8.555	-8.735	-0.181
Fe3(OH)4+5	3.871e-010	2.874e-011	-9.412	-10.541	-1.129
FeHSO4+2	1.231e-010	8.119e-011	-9.910	-10.090	-0.181
FeCl2+	1.197e-011	1.078e-011	-10.922	-10.967	-0.045
Fe(OH)4-	7.433e-012	6.698e-012	-11.129	-11.174	-0.045
FeCl3	1.412e-015	1.416e-015	-14.850	-14.849	0.001
H(0)	1.862e-036				
H2	9.311e-037	9.333e-037	-36.031	-36.030	0.001
K	6.486e-004				
K+	6.412e-004	5.768e-004	-3.193	-3.239	-0.046
KSO4-	7.386e-006	6.657e-006	-5.132	-5.177	-0.045
Mg	1.518e-004				
Mg+2	1.207e-004	8.120e-005	-3.918	-4.090	-0.172
MgSO4	3.119e-005	3.126e-005	-4.506	-4.505	0.001
MgOH+	9.008e-012	8.118e-012	-11.045	-11.091	-0.045
Mn(2)	9.269e-005				
Mn+2	7.749e-005	5.112e-005	-4.111	-4.291	-0.181
MnSO4	1.489e-005	1.493e-005	-4.827	-4.826	0.001

MnCl+	3.034e-007	2.734e-007	-6.518	-6.563	-0.045
Mn(NO3)2	2.108e-009	2.113e-009	-8.676	-8.675	0.001
MnCl2	1.563e-010	1.567e-010	-9.806	-9.805	0.001
MnOH+	4.015e-011	3.618e-011	-10.396	-10.442	-0.045
MnCl3-	6.287e-014	5.666e-014	-13.202	-13.247	-0.045
Mn(OH)3-	1.877e-026	1.692e-026	-25.726	-25.772	-0.045
Mn(3)	4.028e-018				
Mn+3	4.028e-018	1.580e-018	-17.395	-17.801	-0.407
Mn(6)	9.310e-040				
MnO4-2	9.310e-040	6.141e-040	-39.031	-39.212	-0.181
Mn(7)	2.815e-037				
MnO4-	2.815e-037	2.537e-037	-36.551	-36.596	-0.045
N(5)	3.576e-003				
NO3-	3.576e-003	3.222e-003	-2.447	-2.492	-0.045
Mn(NO3)2	2.108e-009	2.113e-009	-8.676	-8.675	0.001
Na	7.877e-004				
Na+	7.812e-004	7.049e-004	-3.107	-3.152	-0.045
NaSO4-	6.438e-006	5.802e-006	-5.191	-5.236	-0.045
O(0)	9.547e-021				
O2	4.773e-021	4.785e-021	-20.321	-20.320	0.001
S(6)	2.727e-003				
SO4-2	2.468e-003	1.642e-003	-2.608	-2.785	-0.177
CaSO4	1.592e-004	1.595e-004	-3.798	-3.797	0.001
MgSO4	3.119e-005	3.126e-005	-4.506	-4.505	0.001
AlSO4+	2.679e-005	2.414e-005	-4.572	-4.617	-0.045
MnSO4	1.489e-005	1.493e-005	-4.827	-4.826	0.001
KSO4-	7.386e-006	6.657e-006	-5.132	-5.177	-0.045
NaSO4-	6.438e-006	5.802e-006	-5.191	-5.236	-0.045
HSO4-	6.433e-006	5.798e-006	-5.192	-5.237	-0.045
ZnSO4	1.722e-006	1.726e-006	-5.764	-5.763	0.001
Al(SO4)2-	1.391e-006	1.254e-006	-5.857	-5.902	-0.045
FeSO4+	9.266e-007	8.351e-007	-6.033	-6.078	-0.045
CuSO4	3.692e-007	3.700e-007	-6.433	-6.432	0.001
FeSO4	1.415e-007	1.418e-007	-6.849	-6.848	0.001
CaHSO4+	3.765e-008	3.393e-008	-7.424	-7.469	-0.045
Zn(SO4)2-2	3.493e-008	2.304e-008	-7.457	-7.637	-0.181
Fe(SO4)2-	3.330e-008	3.001e-008	-7.478	-7.523	-0.045
FeHSO4+2	1.231e-010	8.119e-011	-9.910	-10.090	-0.181
AlHSO4+2	1.178e-010	7.773e-011	-9.929	-10.109	-0.181
FeHSO4+	3.756e-011	3.385e-011	-10.425	-10.470	-0.045
Zn	8.571e-006				
Zn+2	6.796e-006	4.483e-006	-5.168	-5.348	-0.181
ZnSO4	1.722e-006	1.726e-006	-5.764	-5.763	0.001
Zn(SO4)2-2	3.493e-008	2.304e-008	-7.457	-7.637	-0.181
ZnCl+	1.758e-008	1.584e-008	-7.755	-7.800	-0.045
ZnOH+	1.502e-010	1.354e-010	-9.823	-9.869	-0.045
ZnCl2	2.173e-011	2.178e-011	-10.663	-10.662	0.001
ZnOHCl	5.354e-012	5.367e-012	-11.271	-11.270	0.001
Zn(OH)2	4.270e-014	4.280e-014	-13.370	-13.369	0.001
ZnCl3-	3.560e-014	3.208e-014	-13.449	-13.494	-0.045
ZnCl4-2	3.201e-017	2.111e-017	-16.495	-16.675	-0.181
Zn(OH)3-	4.135e-021	3.727e-021	-20.383	-20.429	-0.045
Zn(OH)4-2	2.466e-029	1.627e-029	-28.608	-28.789	-0.181

-----Saturation indices-----

Phase	SI	log IAP	log KT	
Al(OH)3(a)	-2.81	7.99	10.80	Al(OH)3
AlAsO4:2H2O	-6.35	-22.19	-15.84	AlAsO4:2H2O
AlumK	-8.97	-14.14	-5.17	KAl(SO4)2:12H2O
Alunite	3.23	1.83	-1.40	KAl3(SO4)2(OH)6
Anhydrite	-1.74	-6.10	-4.36	CaSO4
Antlerite	-11.19	-2.90	8.29	Cu3(OH)4SO4
Arsenolite	-43.81	-45.19	-1.38	As2O3
As2O5(cr)	-26.35	-18.13	8.23	As2O5
As_native	-59.38	-71.91	-12.53	As

Atacamite	-8.82	-1.48	7.34	$\text{Cu}_2(\text{OH})_3\text{Cl}$
Basaluminite	-2.42	20.28	22.70	$\text{Al}_4(\text{OH})_{10}\text{SO}_4$
Bianchite	-6.37	-8.13	-1.76	$\text{ZnSO}_4 \cdot 6\text{H}_2\text{O}$
Birnessite	-6.13	37.47	43.60	MnO_2
Bixbyite	-8.35	-8.96	-0.61	Mn_2O_3
Boehmite	-0.60	7.99	8.58	AlOOH
Brochantite	-15.31	0.03	15.34	$\text{Cu}_4(\text{OH})_6\text{SO}_4$
Brucite	-12.05	4.79	16.84	$\text{Mg}(\text{OH})_2$
$\text{Ca}_3(\text{AsO}_4)_2 \cdot 4\text{w}$	-24.74	-43.65	-18.91	$\text{Ca}_3(\text{AsO}_4)_2 \cdot 4\text{H}_2\text{O}$
Chalcanthite	-6.10	-8.74	-2.64	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
Claudetite	-43.85	-45.19	-1.34	As_2O_3
$\text{Cu}(\text{OH})_2$	-5.72	2.92	8.64	$\text{Cu}(\text{OH})_2$
$\text{Cu}_2(\text{OH})_3\text{NO}_3$	-10.33	-1.09	9.24	$\text{Cu}_2(\text{OH})_3\text{NO}_3$
Cu_2SO_4	-31.31	-33.26	-1.95	Cu_2SO_4
$\text{Cu}_3(\text{AsO}_4)_2 \cdot 6\text{w}$	-16.46	-51.58	-35.12	$\text{Cu}_3(\text{AsO}_4)_2 \cdot 6\text{H}_2\text{O}$
CuMetal	-18.48	-27.24	-8.76	Cu
CuOCuSO_4	-17.35	-5.82	11.53	$\text{CuO}:\text{CuSO}_4$
CupricFerrite	9.02	14.90	5.88	CuFe_2O_4
Cuprite	-20.04	-21.59	-1.55	Cu_2O
CuprousFerrite	4.11	-4.81	-8.92	CuFeO_2
CuSO_4	-11.75	-8.74	3.01	CuSO_4
Diaspore	1.11	7.99	6.88	AlOOH
Epsomite	-4.74	-6.88	-2.14	$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
$\text{Fe}(\text{OH})_2 \cdot 7\text{Cl} \cdot 3$	6.83	3.79	-3.04	$\text{Fe}(\text{OH})_2 \cdot 7\text{Cl} \cdot 10.3$
$\text{Fe}(\text{OH})_3(\text{a})$	1.10	5.99	4.89	$\text{Fe}(\text{OH})_3$
$\text{Fe}_3(\text{OH})_8$	-5.68	14.54	20.22	$\text{Fe}_3(\text{OH})_8$
Gibbsite	-0.12	7.99	8.11	$\text{Al}(\text{OH})_3$
Goethite	6.99	5.99	-1.00	FeOOH
Goslarite	-6.17	-8.13	-1.96	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
Gypsum	-1.52	-6.10	-4.58	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
$\text{H}_2(\text{g})$	-32.88	-36.03	-3.15	H_2
$\text{H}_2\text{O}(\text{g})$	-1.51	-0.00	1.51	H_2O
Halite	-7.62	-6.03	1.58	NaCl
Hausmannite	-14.38	46.65	61.03	Mn_3O_4
Hematite	15.98	11.97	-4.01	Fe_2O_3
Jarosite(ss)	5.42	-4.41	-9.83	$(\text{K}0.77\text{Na}0.03\text{H}0.2)\text{Fe}_3(\text{SO}_4)_2(\text{OH})_6$
Jarosite-K	5.04	-4.17	-9.21	$\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6$
Jarosite-Na	1.20	-4.08	-5.28	$\text{NaFe}_3(\text{SO}_4)_2(\text{OH})_6$
JarositeH	0.02	-5.37	-5.39	$(\text{H}30)\text{Fe}_3(\text{SO}_4)_2(\text{OH})_6$
Jurbanite	-0.45	-3.68	-3.23	AlOHSO_4
Langite	-16.76	0.03	16.79	$\text{Cu}_4(\text{OH})_6\text{SO}_4 \cdot \text{H}_2\text{O}$
Maghemite	5.59	11.97	6.39	Fe_2O_3
Magnetite	10.80	14.54	3.74	Fe_3O_4
Manganite	-4.31	21.03	25.34	MnOOH
Melanothallite	-15.45	-11.72	3.73	CuCl_2
Melanterite	-6.89	-9.10	-2.21	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
Mirabilite	-7.98	-9.09	-1.11	$\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$
$\text{Mn}_2(\text{SO}_4)_3$	-38.25	-43.96	-5.71	$\text{Mn}_2(\text{SO}_4)_3$
$\text{Mn}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$	-17.87	-46.58	-28.71	$\text{Mn}_3(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$
$\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$	-12.77	-10.06	2.71	$\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$
MnSO_4	-9.74	-7.08	2.67	MnSO_4
Nantokite	-11.36	-18.12	-6.76	CuCl
Nsutite	-5.10	37.47	42.56	MnO_2
$\text{O}_2(\text{g})$	-17.43	-20.32	-2.89	O_2
Portlandite	-17.23	5.57	22.80	$\text{Ca}(\text{OH})_2$
Pyrochroite	-10.61	4.59	15.20	$\text{Mn}(\text{OH})_2$
Pyrolusite	-3.91	37.47	41.38	MnO_2
Scorodite	-3.94	-24.19	-20.25	$\text{FeAsO}_4 \cdot 2\text{H}_2\text{O}$
Tenorite	-4.70	2.92	7.62	CuO
Thenardite	-8.91	-9.09	-0.18	Na_2SO_4
Zincite(c)	-7.61	3.53	11.14	ZnO
Zincosite	-11.14	-8.13	3.01	ZnSO_4
$\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$	-13.77	-10.33	3.44	$\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$
$\text{Zn}(\text{OH})_2\text{-a}$	-8.92	3.53	12.45	$\text{Zn}(\text{OH})_2$
$\text{Zn}(\text{OH})_2\text{-b}$	-8.22	3.53	11.75	$\text{Zn}(\text{OH})_2$
$\text{Zn}(\text{OH})_2\text{-c}$	-8.67	3.53	12.20	$\text{Zn}(\text{OH})_2$
$\text{Zn}(\text{OH})_2\text{-e}$	-7.97	3.53	11.50	$\text{Zn}(\text{OH})_2$

Zn(OH)2-g	-8.18	3.53	11.71	Zn(OH)2
Zn2(OH)2SO4	-12.10	-4.60	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-15.46	-0.26	15.20	Zn2(OH)3Cl
Zn3(AsO4)2:2.5w	-22.21	-49.75	-27.55	Zn3(AsO4)2:2.5H2O
Zn3O(SO4)2	-31.75	-12.73	19.02	ZnO:2ZnSO4
Zn4(OH)6SO4	-25.94	2.46	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-35.49	3.01	38.50	Zn5(OH)8Cl2
ZnCl2	-18.14	-11.11	7.03	ZnCl2
ZnMetal	-55.11	-29.35	25.76	Zn
ZnO(a)	-7.78	3.53	11.31	ZnO
ZnSO4:H2O	-7.56	-8.13	-0.57	ZnSO4:H2O

Initial solution 2. UGA2

-----Solution composition-----

Elements	Molality	Moles
Al	7.168e-004	7.168e-004
As	9.100e-006	9.100e-006
Ca	8.490e-004	8.490e-004
Cl	1.006e-003	1.006e-003
Cu	8.088e-004	8.088e-004
Fe	7.319e-003	7.319e-003
K	3.692e-005	3.692e-005
Mg	3.039e-004	3.039e-004
Mn	4.234e-004	4.234e-004
N(5)	3.482e-003	3.482e-003
Na	3.602e-004	3.602e-004
S(6)	2.058e-002	2.058e-002
Zn	4.295e-005	4.295e-005

-----Description of solution-----

pH	=	2.460
pe	=	12.000
Activity of water	=	0.999
Ionic strength	=	3.828e-002
Mass of water (kg)	=	1.000e+000
Total alkalinity (eq/kg)	=	-1.684e-002
Total carbon (mol/kg)	=	0.000e+000
Total CO2 (mol/kg)	=	0.000e+000
Temperature (deg C)	=	25.000
Electrical balance (eq)	=	-1.219e-002
Percent error, 100*(Cat- An)/(Cat+ An)	=	-26.59
Iterations	=	10
Total H	=	1.110190e+002
Total O	=	5.559930e+001

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma
H+	4.010e-003	3.467e-003	-2.397	-2.460	-0.063
OH-	3.449e-012	2.886e-012	-11.462	-11.540	-0.077
H2O	5.551e+001	9.994e-001	1.744	-0.000	0.000
Al	7.168e-004				
AlSO4+	5.064e-004	4.236e-004	-3.296	-3.373	-0.077
Al+3	1.234e-004	2.476e-005	-3.909	-4.606	-0.697
Al(SO4)2-	8.665e-005	7.249e-005	-4.062	-4.140	-0.077
AlHSO4+2	2.659e-007	1.303e-007	-6.575	-6.885	-0.310
AlOH+2	1.447e-007	7.089e-008	-6.839	-7.149	-0.310
Al(OH)2+	1.914e-010	1.602e-010	-9.718	-9.795	-0.077
Al(OH)3	6.742e-015	6.802e-015	-14.171	-14.167	0.004
Al(OH)4-	4.417e-018	3.695e-018	-17.355	-17.432	-0.077
As(3)	8.952e-016				

H3AsO3	8.934e-016	9.013e-016	-15.049	-15.045	0.004
H4AsO3+	1.851e-018	1.548e-018	-17.733	-17.810	-0.077
H2AsO3-	2.200e-022	1.840e-022	-21.658	-21.735	-0.077
HAsO3-2	2.162e-034	1.059e-034	-33.665	-33.975	-0.310
AsO3-3	0.000e+000	0.000e+000	-46.518	-47.215	-0.697
As(5)	9.100e-006				
H2AsO4-	5.782e-006	4.837e-006	-5.238	-5.315	-0.077
H3AsO4	3.317e-006	3.347e-006	-5.479	-5.475	0.004
HAsO4-2	1.970e-010	9.652e-011	-9.705	-10.015	-0.310
AsO4-3	3.105e-019	6.232e-020	-18.508	-19.205	-0.697
Ca	8.490e-004				
Ca+2	5.459e-004	2.765e-004	-3.263	-3.558	-0.295
CaSO4	2.959e-004	2.985e-004	-3.529	-3.525	0.004
CaHSO4+	7.248e-006	6.064e-006	-5.140	-5.217	-0.077
CaOH+	1.581e-014	1.323e-014	-13.801	-13.879	-0.077
Cl	1.006e-003				
Cl-	1.000e-003	8.306e-004	-3.000	-3.081	-0.081
FeCl+2	3.089e-006	1.513e-006	-5.510	-5.820	-0.310
FeCl+	8.656e-007	7.242e-007	-6.063	-6.140	-0.077
CuCl+	6.885e-007	5.760e-007	-6.162	-6.240	-0.077
MnCl+	5.710e-007	4.777e-007	-6.243	-6.321	-0.077
ZnCl+	3.360e-008	2.811e-008	-7.474	-7.551	-0.077
FeCl2+	6.710e-009	5.613e-009	-8.173	-8.251	-0.077
CuCl2	2.547e-010	2.569e-010	-9.594	-9.590	0.004
MnCl2	1.717e-010	1.732e-010	-9.765	-9.761	0.004
ZnCl2	2.423e-011	2.445e-011	-10.616	-10.612	0.004
FeCl3	4.622e-013	4.663e-013	-12.335	-12.331	0.004
ZnOHC1	9.881e-014	9.969e-014	-13.005	-13.001	0.004
MnCl3-	4.736e-014	3.962e-014	-13.325	-13.402	-0.077
CuCl2-	3.526e-014	2.950e-014	-13.453	-13.530	-0.077
ZnCl3-	2.724e-014	2.279e-014	-13.565	-13.642	-0.077
CuCl3-	9.050e-016	7.571e-016	-15.043	-15.121	-0.077
CuCl3-2	7.927e-017	3.883e-017	-16.101	-16.411	-0.310
ZnCl4-2	1.936e-017	9.485e-018	-16.713	-17.023	-0.310
CuCl4-2	6.435e-021	3.152e-021	-20.191	-20.501	-0.310
Cu(1)	1.970e-013				
Cu+	1.616e-013	1.352e-013	-12.792	-12.869	-0.077
CuCl2-	3.526e-014	2.950e-014	-13.453	-13.530	-0.077
CuCl3-2	7.927e-017	3.883e-017	-16.101	-16.411	-0.310
Cu(2)	8.088e-004				
Cu+2	5.260e-004	2.576e-004	-3.279	-3.589	-0.310
CuSO4	2.821e-004	2.846e-004	-3.550	-3.546	0.004
CuCl+	6.885e-007	5.760e-007	-6.162	-6.240	-0.077
CuOH+	8.877e-010	7.426e-010	-9.052	-9.129	-0.077
CuCl2	2.547e-010	2.569e-010	-9.594	-9.590	0.004
Cu2(OH)2+2	4.927e-013	2.413e-013	-12.307	-12.617	-0.310
Cu(OH)2	4.433e-013	4.472e-013	-12.353	-12.349	0.004
CuCl3-	9.050e-016	7.571e-016	-15.043	-15.121	-0.077
CuCl4-2	6.435e-021	3.152e-021	-20.191	-20.501	-0.310
Cu(OH)3-	9.285e-024	7.768e-024	-23.032	-23.110	-0.077
Cu(OH)4-2	9.120e-034	4.467e-034	-33.040	-33.350	-0.310
Fe(2)	1.909e-003				
Fe+2	1.289e-003	6.316e-004	-2.890	-3.200	-0.310
FeSO4	6.024e-004	6.077e-004	-3.220	-3.216	0.004
FeHSO4+	1.656e-005	1.385e-005	-4.781	-4.859	-0.077
FeCl+	8.656e-007	7.242e-007	-6.063	-6.140	-0.077
FeOH+	6.882e-011	5.757e-011	-10.162	-10.240	-0.077
Fe(OH)2	1.400e-019	1.412e-019	-18.854	-18.850	0.004
Fe(OH)3-	1.808e-027	1.513e-027	-26.743	-26.820	-0.077
Fe(3)	5.409e-003				
FeSO4+	4.278e-003	3.579e-003	-2.369	-2.446	-0.077
Fe(SO4)2-	5.063e-004	4.236e-004	-3.296	-3.373	-0.077
Fe+3	3.005e-004	6.032e-005	-3.522	-4.220	-0.697
FeOH+2	2.292e-004	1.123e-004	-3.640	-3.950	-0.310
FeHSO4+2	6.783e-005	3.323e-005	-4.169	-4.479	-0.310
Fe(OH)2+	1.281e-005	1.071e-005	-4.893	-4.970	-0.077
Fe2(OH)2+4	5.892e-006	3.392e-007	-5.230	-6.470	-1.240

FeCl+2	3.089e-006	1.513e-006	-5.510	-5.820	-0.310
Fe3(OH)4+5	6.571e-008	7.593e-010	-7.182	-9.120	-1.937
FeCl2+	6.710e-009	5.613e-009	-8.173	-8.251	-0.077
Fe(OH)3	3.944e-010	3.979e-010	-9.404	-9.400	0.004
FeCl3	4.622e-013	4.663e-013	-12.335	-12.331	0.004
Fe(OH)4-	1.250e-016	1.046e-016	-15.903	-15.981	-0.077
H(0)	1.687e-032				
H2	8.437e-033	8.511e-033	-32.074	-32.070	0.004
K	3.692e-005				
K+	3.558e-005	2.954e-005	-4.449	-4.530	-0.081
KSO4-	1.343e-006	1.123e-006	-5.872	-5.950	-0.077
Mg	3.039e-004				
Mg+2	1.843e-004	9.519e-005	-3.735	-4.021	-0.287
MgSO4	1.197e-004	1.207e-004	-3.922	-3.918	0.004
MgOH+	1.191e-013	9.962e-014	-12.924	-13.002	-0.077
Mn(2)	4.234e-004				
Mn+2	2.882e-004	1.412e-004	-3.540	-3.850	-0.310
MnSO4	1.346e-004	1.358e-004	-3.871	-3.867	0.004
MnCl+	5.710e-007	4.777e-007	-6.243	-6.321	-0.077
Mn(NO3)2	4.728e-009	4.770e-009	-8.325	-8.321	0.004
MnCl2	1.717e-010	1.732e-010	-9.765	-9.761	0.004
MnOH+	1.250e-012	1.046e-012	-11.903	-11.981	-0.077
MnCl3-	4.736e-014	3.962e-014	-13.325	-13.402	-0.077
Mn(OH)3-	6.405e-032	5.358e-032	-31.194	-31.271	-0.077
Mn(3)	2.173e-017				
Mn+3	2.173e-017	4.362e-018	-16.663	-17.360	-0.697
Mn(6)	0.000e+000				
MnO4-2	0.000e+000	0.000e+000	-54.301	-54.611	-0.310
Mn(7)	0.000e+000				
MnO4-	0.000e+000	0.000e+000	-51.918	-51.995	-0.077
N(5)	3.482e-003				
NO3-	3.482e-003	2.913e-003	-2.458	-2.536	-0.077
Mn(NO3)2	4.728e-009	4.770e-009	-8.325	-8.321	0.004
Na	3.602e-004				
Na+	3.507e-004	2.941e-004	-3.455	-3.531	-0.076
NaSO4-	9.534e-006	7.976e-006	-5.021	-5.098	-0.077
O(0)	1.140e-028				
O2	5.698e-029	5.748e-029	-28.244	-28.240	0.004
S(6)	2.058e-002				
SO4-2	1.088e-002	5.411e-003	-1.964	-2.267	-0.303
FeSO4+	4.278e-003	3.579e-003	-2.369	-2.446	-0.077
HSO4-	2.180e-003	1.824e-003	-2.661	-2.739	-0.077
FeSO4	6.024e-004	6.077e-004	-3.220	-3.216	0.004
AlSO4+	5.064e-004	4.236e-004	-3.296	-3.373	-0.077
Fe(SO4)2-	5.063e-004	4.236e-004	-3.296	-3.373	-0.077
CaSO4	2.959e-004	2.985e-004	-3.529	-3.525	0.004
CuSO4	2.821e-004	2.846e-004	-3.550	-3.546	0.004
MnSO4	1.346e-004	1.358e-004	-3.871	-3.867	0.004
MgSO4	1.197e-004	1.207e-004	-3.922	-3.918	0.004
Al(SO4)2-	8.665e-005	7.249e-005	-4.062	-4.140	-0.077
FeHSO4+2	6.783e-005	3.323e-005	-4.169	-4.479	-0.310
FeHSO4+	1.656e-005	1.385e-005	-4.781	-4.859	-0.077
ZnSO4	1.581e-005	1.595e-005	-4.801	-4.797	0.004
NaSO4-	9.534e-006	7.976e-006	-5.021	-5.098	-0.077
CaHSO4+	7.248e-006	6.064e-006	-5.140	-5.217	-0.077
Zn(SO4)2-2	1.432e-006	7.014e-007	-5.844	-6.154	-0.310
KSO4-	1.343e-006	1.123e-006	-5.872	-5.950	-0.077
AlHSO4+2	2.659e-007	1.303e-007	-6.575	-6.885	-0.310
Zn	4.295e-005				
Zn+2	2.567e-005	1.257e-005	-4.591	-4.901	-0.310
ZnSO4	1.581e-005	1.595e-005	-4.801	-4.797	0.004
Zn(SO4)2-2	1.432e-006	7.014e-007	-5.844	-6.154	-0.310
ZnCl+	3.360e-008	2.811e-008	-7.474	-7.551	-0.077
ZnCl2	2.423e-011	2.445e-011	-10.616	-10.612	0.004
ZnOH+	4.750e-012	3.974e-012	-11.323	-11.401	-0.077
ZnOHCl	9.881e-014	9.969e-014	-13.005	-13.001	0.004
ZnCl3-	2.724e-014	2.279e-014	-13.565	-13.642	-0.077

ZnCl4-2	1.936e-017	9.485e-018	-16.713	-17.023	-0.310
Zn(OH)2	1.304e-017	1.315e-017	-16.885	-16.881	0.004
Zn(OH)3-	1.433e-026	1.199e-026	-25.844	-25.921	-0.077
Zn(OH)4-2	1.118e-036	5.477e-037	-35.952	-36.261	-0.310

-----Saturation indices-----

Phase	SI	log IAP	log KT	
Al(OH)3(a)	-8.03	2.77	10.80	Al(OH)3
AlAsO4:2H2O	-7.98	-23.81	-15.84	AlAsO4:2H2O
AlumK	-8.50	-13.67	-5.17	KAl(SO4)2:12H2O
Alunite	-6.72	-8.12	-1.40	KAl3(SO4)2(OH)6
Anhydrite	-1.46	-5.83	-4.36	CaSO4
Antlerite	-11.48	-3.19	8.29	Cu3(OH)4SO4
Arsenolite	-28.71	-30.09	-1.38	As2O3
As2O5(cr)	-19.18	-10.95	8.23	As2O5
As_native	-45.89	-58.42	-12.53	As
Atacamite	-10.22	-2.88	7.34	Cu2(OH)3Cl
Basaluminate	-18.79	3.91	22.70	Al4(OH)10SO4
Bianchite	-5.40	-7.17	-1.76	ZnSO4:6H2O
Birnessite	-13.61	29.99	43.60	MnO2
Bixbyite	-19.35	-19.96	-0.61	Mn2O3
Boehmite	-5.81	2.77	8.58	AlOOH
Brochantite	-17.20	-1.86	15.34	Cu4(OH)6SO4
Brucite	-15.94	0.90	16.84	Mg(OH)2
Ca3(AsO4)2:4w	-30.18	-49.09	-18.91	Ca3(AsO4)2:4H2O
Chalcanthite	-3.22	-5.86	-2.64	CuSO4:5H2O
Claudetite	-28.75	-30.09	-1.34	As2O3
Cu(OH)2	-7.31	1.33	8.64	Cu(OH)2
Cu2(OH)3NO3	-11.57	-2.33	9.24	Cu2(OH)3NO3
Cu2SO4	-26.05	-28.00	-1.95	Cu2SO4
Cu3(AsO4)2:6w	-14.06	-49.18	-35.12	Cu3(AsO4)2:6H2O
CuMetal	-16.11	-24.87	-8.76	Cu
CuOCuSO4	-16.05	-4.52	11.53	CuO:CuSO4
CupricFerrite	1.77	7.65	5.88	CuFe2O4
Cuprite	-19.27	-20.82	-1.55	Cu2O
CuprousFerrite	1.67	-7.25	-8.92	CuFeO2
CuSO4	-8.87	-5.86	3.01	CuSO4
Diaspore	-4.11	2.77	6.88	AlOOH
Epsomite	-4.15	-6.29	-2.14	MgSO4:7H2O
Fe(OH)2.7Cl.3	4.54	1.50	-3.04	Fe(OH)2.7Cl0.3
Fe(OH)3(a)	-1.73	3.16	4.89	Fe(OH)3
Fe3(OH)8	-12.18	8.04	20.22	Fe3(OH)8
Gibbsite	-5.34	2.77	8.11	Al(OH)3
Goethite	4.16	3.16	-1.00	FeOOH
Goslarite	-5.21	-7.17	-1.96	ZnSO4:7H2O
Gypsum	-1.24	-5.83	-4.58	CaSO4:2H2O
H2(g)	-28.92	-32.07	-3.15	H2
H2O(g)	-1.51	-0.00	1.51	H2O
Halite	-8.19	-6.61	1.58	NaCl
Hausmannite	-28.90	32.13	61.03	Mn3O4
Hematite	10.33	6.32	-4.01	Fe2O3
Jarosite(ss)	3.31	-6.52	-9.83	(K0.77Na0.03H0.2)Fe3(SO4)2(OH)6
Jarosite-K	2.25	-6.96	-9.21	KFe3(SO4)2(OH)6
Jarosite-Na	-0.69	-5.97	-5.28	NaFe3(SO4)2(OH)6
JarositeH	0.50	-4.89	-5.39	(H3O)Fe3(SO4)2(OH)6
Jurbanite	-1.18	-4.41	-3.23	AlOHSO4
Langite	-18.65	-1.86	16.79	Cu4(OH)6SO4:H2O
Maghemite	-0.07	6.32	6.39	Fe2O3
Magnetite	4.30	8.04	3.74	Fe3O4
Manganite	-9.81	15.53	25.34	MnOOH
Melanothallite	-13.48	-9.75	3.73	CuCl2
Melanterite	-3.26	-5.47	-2.21	FeSO4:7H2O
Mirabilite	-8.22	-9.33	-1.11	Na2SO4:10H2O
Mn2(SO4)3	-35.81	-41.52	-5.71	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-21.26	-49.96	-28.71	Mn3(AsO4)2:8H2O

MnCl2:4H2O	-12.72	-10.01	2.71	MnCl2:4H2O
MnSO4	-8.79	-6.12	2.67	MnSO4
Nantokite	-9.19	-15.95	-6.76	CuCl
Nsutite	-12.57	29.99	42.56	MnO2
O2(g)	-25.35	-28.24	-2.89	O2
Portlandite	-21.44	1.36	22.80	Ca(OH)2
Pyrochroite	-14.13	1.07	15.20	Mn(OH)2
Pyrolusite	-11.39	29.99	41.38	MnO2
Scorodite	-3.18	-23.43	-20.25	FeAsO4:2H2O
Tenorite	-6.29	1.33	7.62	CuO
Thenardite	-9.15	-9.33	-0.18	Na2SO4
Zincite(c)	-11.12	0.02	11.14	ZnO
Zincosite	-10.18	-7.17	3.01	ZnSO4
Zn(NO3)2:6H2O	-13.41	-9.97	3.44	Zn(NO3)2:6H2O
Zn(OH)2-a	-12.43	0.02	12.45	Zn(OH)2
Zn(OH)2-b	-11.73	0.02	11.75	Zn(OH)2
Zn(OH)2-c	-12.18	0.02	12.20	Zn(OH)2
Zn(OH)2-e	-11.48	0.02	11.50	Zn(OH)2
Zn(OH)2-g	-11.69	0.02	11.71	Zn(OH)2
Zn2(OH)2SO4	-14.65	-7.15	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-20.70	-5.50	15.20	Zn2(OH)3Cl
Zn3(AsO4)2:2.5w	-25.57	-53.11	-27.55	Zn3(AsO4)2:2.5H2O
Zn3O(SO4)2	-33.34	-14.32	19.02	ZnO:2ZnSO4
Zn4(OH)6SO4	-35.51	-7.11	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-49.49	-10.99	38.50	Zn5(OH)8Cl2
ZnCl2	-18.09	-11.06	7.03	ZnCl2
ZnMetal	-54.66	-28.90	25.76	Zn
ZnO(a)	-11.29	0.02	11.31	ZnO
ZnSO4:H2O	-6.60	-7.17	-0.57	ZnSO4:H2O

Initial solution 3. UGA3

-----Solution composition-----

Elements	Molality	Moles
Al	5.539e-004	5.539e-004
As	7.362e-005	7.362e-005
Ca	1.735e-003	1.735e-003
Cl	9.521e-004	9.521e-004
Cu	6.736e-004	6.736e-004
Fe	2.331e-003	2.331e-003
Mg	2.631e-004	2.631e-004
Mn	6.341e-004	6.341e-004
N(5)	3.172e-003	3.172e-003
Na	3.875e-004	3.875e-004
S(6)	6.630e-003	6.630e-003
Zn	1.194e-005	1.194e-005

-----Description of solution-----

pH	=	4.100
pe	=	12.000
Activity of water	=	1.000
Ionic strength	=	2.085e-002
Mass of water (kg)	=	1.000e+000
Total alkalinity (eq/kg)	=	-1.044e-003
Total carbon (mol/kg)	=	0.000e+000
Total CO2 (mol/kg)	=	0.000e+000
Temperature (deg C)	=	25.000
Electrical balance (eq)	=	-5.311e-003
Percent error, 100*(Cat- An)/(Cat+ An)	=	-22.37
Iterations	=	11
Total H	=	1.110163e+002
Total O	=	5.554611e+001

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma
H+	8.944e-005	7.943e-005	-4.048	-4.100	-0.052
OH-	1.450e-010	1.260e-010	-9.839	-9.900	-0.061
H2O	5.551e+001	9.997e-001	1.744	-0.000	0.000
Al	5.539e-004				
AlSO4+	3.835e-004	3.332e-004	-3.416	-3.477	-0.061
Al+3	1.262e-004	3.560e-005	-3.899	-4.449	-0.550
Al(SO4)2-	3.589e-005	3.118e-005	-4.445	-4.506	-0.061
AlOH+2	7.811e-006	4.451e-006	-5.107	-5.352	-0.244
Al(OH)2+	5.053e-007	4.390e-007	-6.296	-6.358	-0.061
AlHSO4+2	4.119e-009	2.347e-009	-8.385	-8.630	-0.244
Al(OH)3	8.103e-010	8.142e-010	-9.091	-9.089	0.002
Al(OH)4-	2.223e-011	1.931e-011	-10.653	-10.714	-0.061
As(3)	1.404e-019				
H3AsO3	1.404e-019	1.411e-019	-18.853	-18.850	0.002
H4AsO3+	6.392e-024	5.553e-024	-23.194	-23.255	-0.061
H2AsO3-	1.448e-024	1.258e-024	-23.839	-23.900	-0.061
HAsO3-2	5.544e-035	3.159e-035	-34.256	-34.500	-0.244
AsO3-3	0.000e+000	0.000e+000	-45.551	-46.100	-0.550
As(5)	7.362e-005				
H2AsO4-	7.253e-005	6.301e-005	-4.139	-4.201	-0.061
H3AsO4	9.939e-007	9.987e-007	-6.003	-6.001	0.002
HAsO4-2	9.632e-008	5.488e-008	-7.016	-7.261	-0.244
AsO4-3	5.484e-015	1.547e-015	-14.261	-14.811	-0.550
Ca	1.735e-003				
Ca+2	1.292e-003	7.531e-004	-2.889	-3.123	-0.234
CaSO4	4.426e-004	4.447e-004	-3.354	-3.352	0.002
CaHSO4+	2.382e-007	2.069e-007	-6.623	-6.684	-0.061
CaOH+	1.810e-012	1.573e-012	-11.742	-11.803	-0.061
Cl	9.521e-004				
Cl-	9.501e-004	8.222e-004	-3.022	-3.085	-0.063
MnCl+	1.071e-006	9.305e-007	-5.970	-6.031	-0.061
CuCl+	7.273e-007	6.319e-007	-6.138	-6.199	-0.061
FeCl+2	1.612e-007	9.188e-008	-6.793	-7.037	-0.244
FeCl+	5.061e-008	4.398e-008	-7.296	-7.357	-0.061
ZnCl+	1.228e-008	1.067e-008	-7.911	-7.972	-0.061
FeCl2+	3.884e-010	3.374e-010	-9.411	-9.472	-0.061
MnCl2	3.324e-010	3.340e-010	-9.478	-9.476	0.002
CuCl2	2.777e-010	2.790e-010	-9.556	-9.554	0.002
ZnCl2	9.143e-012	9.187e-012	-11.039	-11.037	0.002
ZnOHCl	1.644e-012	1.652e-012	-11.784	-11.782	0.002
MnCl3-	8.705e-014	7.563e-014	-13.060	-13.121	-0.061
CuCl2-	3.687e-014	3.204e-014	-13.433	-13.494	-0.061
FeCl3	2.761e-014	2.775e-014	-13.559	-13.557	0.002
ZnCl3-	9.755e-015	8.476e-015	-14.011	-14.072	-0.061
CuCl3-	9.369e-016	8.140e-016	-15.028	-15.089	-0.061
CuCl3-2	7.327e-017	4.175e-017	-16.135	-16.379	-0.244
ZnCl4-2	6.130e-018	3.493e-018	-17.213	-17.457	-0.244
CuCl4-2	5.887e-021	3.355e-021	-20.230	-20.474	-0.244
Cu(1)	2.094e-013				
Cu+	1.725e-013	1.498e-013	-12.763	-12.824	-0.061
CuCl2-	3.687e-014	3.204e-014	-13.433	-13.494	-0.061
CuCl3-2	7.327e-017	4.175e-017	-16.135	-16.379	-0.244
Cu(2)	6.736e-004				
Cu+2	5.011e-004	2.855e-004	-3.300	-3.544	-0.244
CuSO4	1.717e-004	1.725e-004	-3.765	-3.763	0.002
CuCl+	7.273e-007	6.319e-007	-6.138	-6.199	-0.061
CuOH+	4.136e-008	3.594e-008	-7.383	-7.444	-0.061
Cu2(OH)2+2	9.918e-010	5.651e-010	-9.004	-9.248	-0.244
Cu(OH)2	9.404e-010	9.450e-010	-9.027	-9.025	0.002
CuCl2	2.777e-010	2.790e-010	-9.556	-9.554	0.002
CuCl3-	9.369e-016	8.140e-016	-15.028	-15.089	-0.061
Cu(OH)3-	8.248e-019	7.166e-019	-18.084	-18.145	-0.061
CuCl4-2	5.887e-021	3.355e-021	-20.230	-20.474	-0.244

Cu(OH)4-2	3.158e-027	1.800e-027	-26.501	-26.745	-0.244
Fe(2)	8.835e-005				
Fe+2	6.800e-005	3.874e-005	-4.168	-4.412	-0.244
FeSO4	2.029e-005	2.039e-005	-4.693	-4.691	0.002
FeCl+	5.061e-008	4.398e-008	-7.296	-7.357	-0.061
FeHSO4+	1.225e-008	1.065e-008	-7.912	-7.973	-0.061
FeOH+	1.775e-010	1.542e-010	-9.751	-9.812	-0.061
Fe(OH)2	1.644e-017	1.652e-017	-16.784	-16.782	0.002
Fe(OH)3-	8.891e-024	7.724e-024	-23.051	-23.112	-0.061
Fe(3)	2.243e-003				
Fe(OH)2+	1.442e-003	1.253e-003	-2.841	-2.902	-0.061
FeOH+2	5.277e-004	3.007e-004	-3.278	-3.522	-0.244
FeSO4+	1.382e-004	1.201e-004	-3.860	-3.921	-0.061
Fe2(OH)2+4	2.309e-005	2.433e-006	-4.637	-5.614	-0.977
Fe3(OH)4+5	2.143e-005	6.370e-007	-4.669	-6.196	-1.527
Fe+3	1.312e-005	3.700e-006	-4.882	-5.432	-0.550
Fe(SO4)2-	8.948e-006	7.774e-006	-5.048	-5.109	-0.061
Fe(OH)3	2.022e-006	2.032e-006	-5.694	-5.692	0.002
FeCl+2	1.612e-007	9.188e-008	-6.793	-7.037	-0.244
FeHSO4+2	4.482e-008	2.554e-008	-7.349	-7.593	-0.244
FeCl2+	3.884e-010	3.374e-010	-9.411	-9.472	-0.061
Fe(OH)4-	2.684e-011	2.332e-011	-10.571	-10.632	-0.061
FeCl3	2.761e-014	2.775e-014	-13.559	-13.557	0.002
H(0)	8.891e-036				
H2	4.445e-036	4.467e-036	-35.352	-35.350	0.002
Mg	2.631e-004				
Mg+2	1.869e-004	1.103e-004	-3.728	-3.957	-0.229
MgSO4	7.616e-005	7.652e-005	-4.118	-4.116	0.002
MgOH+	5.801e-012	5.040e-012	-11.236	-11.298	-0.061
Mn(2)	6.341e-004				
Mn+2	4.875e-004	2.778e-004	-3.312	-3.556	-0.244
MnSO4	1.455e-004	1.462e-004	-3.837	-3.835	0.002
MnCl+	1.071e-006	9.305e-007	-5.970	-6.031	-0.061
Mn(NO3)2	8.361e-009	8.401e-009	-8.078	-8.076	0.002
MnCl2	3.324e-010	3.340e-010	-9.478	-9.476	0.002
MnOH+	1.034e-010	8.986e-011	-9.985	-10.046	-0.061
MnCl3-	8.705e-014	7.563e-014	-13.060	-13.121	-0.061
Mn(OH)3-	1.010e-026	8.777e-027	-25.996	-26.057	-0.061
Mn(3)	3.043e-017				
Mn+3	3.043e-017	8.584e-018	-16.517	-17.066	-0.550
Mn(6)	0.000e+000				
MnO4-2	0.000e+000	0.000e+000	-40.952	-41.197	-0.244
Mn(7)	3.022e-039				
MnO4-	3.022e-039	2.626e-039	-38.520	-38.581	-0.061
N(5)	3.172e-003				
NO3-	3.172e-003	2.756e-003	-2.499	-2.560	-0.061
Mn(NO3)2	8.361e-009	8.401e-009	-8.078	-8.076	0.002
Na	3.875e-004				
Na+	3.819e-004	3.324e-004	-3.418	-3.478	-0.060
NaSO4-	5.675e-006	4.930e-006	-5.246	-5.307	-0.061
O(0)	4.156e-022				
O2	2.078e-022	2.088e-022	-21.682	-21.680	0.002
S(6)	6.630e-003				
SO4-2	5.127e-003	2.959e-003	-2.290	-2.529	-0.239
CaSO4	4.426e-004	4.447e-004	-3.354	-3.352	0.002
AlSO4+	3.835e-004	3.332e-004	-3.416	-3.477	-0.061
CuSO4	1.717e-004	1.725e-004	-3.765	-3.763	0.002
MnSO4	1.455e-004	1.462e-004	-3.837	-3.835	0.002
FeSO4+	1.382e-004	1.201e-004	-3.860	-3.921	-0.061
MgSO4	7.616e-005	7.652e-005	-4.118	-4.116	0.002
Al(SO4)2-	3.589e-005	3.118e-005	-4.445	-4.506	-0.061
HSO4-	2.631e-005	2.286e-005	-4.580	-4.641	-0.061
FeSO4	2.029e-005	2.039e-005	-4.693	-4.691	0.002
Fe(SO4)2-	8.948e-006	7.774e-006	-5.048	-5.109	-0.061
NaSO4-	5.675e-006	4.930e-006	-5.246	-5.307	-0.061
ZnSO4	3.329e-006	3.345e-006	-5.478	-5.476	0.002
CaHSO4+	2.382e-007	2.069e-007	-6.623	-6.684	-0.061

Zn(SO4)2-2	1.412e-007	8.046e-008	-6.850	-7.094	-0.244
FeHSO4+2	4.482e-008	2.554e-008	-7.349	-7.593	-0.244
FeHSO4+	1.225e-008	1.065e-008	-7.912	-7.973	-0.061
AlHSO4+2	4.119e-009	2.347e-009	-8.385	-8.630	-0.244
Zn	1.194e-005				
Zn+2	8.462e-006	4.821e-006	-5.073	-5.317	-0.244
ZnSO4	3.329e-006	3.345e-006	-5.478	-5.476	0.002
Zn(SO4)2-2	1.412e-007	8.046e-008	-6.850	-7.094	-0.244
ZnCl+	1.228e-008	1.067e-008	-7.911	-7.972	-0.061
ZnOH+	7.658e-011	6.654e-011	-10.116	-10.177	-0.061
ZnCl2	9.143e-012	9.187e-012	-11.039	-11.037	0.002
ZnOHCl	1.644e-012	1.652e-012	-11.784	-11.782	0.002
ZnCl3-	9.755e-015	8.476e-015	-14.011	-14.072	-0.061
Zn(OH)2	9.569e-015	9.615e-015	-14.019	-14.017	0.002
ZnCl4-2	6.130e-018	3.493e-018	-17.213	-17.457	-0.244
Zn(OH)3-	4.404e-022	3.827e-022	-21.356	-21.417	-0.061
Zn(OH)4-2	1.340e-030	7.633e-031	-29.873	-30.117	-0.244

-----Saturation indices-----

Phase	SI	log IAP	log KT	
Al(OH)3(a)	-2.95	7.85	10.80	Al(OH)3
AlAsO4:2H2O	-3.42	-19.26	-15.84	AlAsO4:2H2O
Anhydrite	-1.29	-5.65	-4.36	CaSO4
Antlerite	-5.05	3.24	8.29	Cu3(OH)4SO4
Arsenolite	-36.32	-37.70	-1.38	As2O3
As2O5(cr)	-20.23	-12.00	8.23	As2O5
As_native	-54.62	-67.15	-12.53	As
Atacamite	-5.21	2.13	7.34	Cu2(OH)3Cl
Basaluminite	-2.02	20.68	22.70	Al4(OH)10SO4
Bianchite	-6.08	-7.85	-1.76	ZnSO4:6H2O
Birnessite	-6.76	36.84	43.60	MnO2
Bixbyite	-8.92	-9.53	-0.61	Mn2O3
Boehmite	-0.73	7.85	8.58	AlOOH
Brochantite	-7.45	7.89	15.34	Cu4(OH)6SO4
Brucite	-12.60	4.24	16.84	Mg(OH)2
Ca3(AsO4)2:4w	-20.09	-38.99	-18.91	Ca3(AsO4)2:4H2O
Chalcanthite	-3.43	-6.07	-2.64	CuSO4:5H2O
Claudetite	-36.36	-37.70	-1.34	As2O3
Cu(OH)2	-3.98	4.66	8.64	Cu(OH)2
Cu2(OH)3NO3	-6.59	2.65	9.24	Cu2(OH)3NO3
Cu2SO4	-26.23	-28.18	-1.95	Cu2SO4
Cu3(AsO4)2:6w	-5.13	-40.25	-35.12	Cu3(AsO4)2:6H2O
CuMetal	-16.06	-24.82	-8.76	Cu
CuOCuSO4	-12.95	-1.42	11.53	CuO:CuSO4
CupricFerrite	12.51	18.39	5.88	CuFe2O4
Cuprite	-15.90	-17.45	-1.55	Cu2O
CuprousFerrite	7.06	-1.86	-8.92	CuFeO2
CuSO4	-9.08	-6.07	3.01	CuSO4
Diaspore	0.97	7.85	6.88	AlOOH
Epsomite	-4.35	-6.49	-2.14	MgSO4:7H2O
Fe(OH)2.7Cl0.3	7.75	4.71	-3.04	Fe(OH)2.7Cl0.3
Fe(OH)3(a)	1.98	6.87	4.89	Fe(OH)3
Fe3(OH)8	-2.70	17.52	20.22	Fe3(OH)8
Gibbsite	-0.26	7.85	8.11	Al(OH)3
Goethite	7.87	6.87	-1.00	FeOOH
Goslarite	-5.89	-7.85	-1.96	ZnSO4:7H2O
Gypsum	-1.07	-5.65	-4.58	CaSO4:2H2O
H2(g)	-32.20	-35.35	-3.15	H2
H2O(g)	-1.51	-0.00	1.51	H2O
Halite	-8.15	-6.56	1.58	NaCl
Hausmannite	-14.90	46.13	61.03	Mn3O4
Hematite	17.74	13.74	-4.01	Fe2O3
Jarosite-Na	5.05	-0.23	-5.28	NaFe3(SO4)2(OH)6
JarositeH	4.54	-0.85	-5.39	(H3O)Fe3(SO4)2(OH)6
Jurbanite	0.35	-2.88	-3.23	AlOHSO4

Langite	-8.90	7.89	16.79	Cu4(OH)6SO4:H2O
Maghemite	7.35	13.74	6.39	Fe2O3
Magnetite	13.79	17.52	3.74	Fe3O4
Manganite	-4.60	20.74	25.34	MnOOH
Melanothallite	-13.44	-9.71	3.73	CuCl2
Melanterite	-4.73	-6.94	-2.21	FeSO4:7H2O
Mirabilite	-8.37	-9.49	-1.11	Na2SO4:10H2O
Mn2(SO4)3	-36.01	-41.72	-5.71	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-11.58	-40.29	-28.71	Mn3(AsO4)2:8H2O
MnCl2:4H2O	-12.44	-9.73	2.71	MnCl2:4H2O
MnSO4	-8.75	-6.09	2.67	MnSO4
Nantokite	-9.15	-15.91	-6.76	CuCl
Nsutite	-5.72	36.84	42.56	MnO2
O2(g)	-18.79	-21.68	-2.89	O2
Portlandite	-17.72	5.08	22.80	Ca(OH)2
Pyrochroite	-10.56	4.64	15.20	Mn(OH)2
Pyrolusite	-4.54	36.84	41.38	MnO2
Scorodite	0.01	-20.24	-20.25	FeAsO4:2H2O
Tenorite	-2.96	4.66	7.62	CuO
Thenardite	-9.31	-9.49	-0.18	Na2SO4
Zincite(c)	-8.26	2.88	11.14	ZnO
Zincosite	-10.86	-7.85	3.01	ZnSO4
Zn(NO3)2:6H2O	-13.88	-10.44	3.44	Zn(NO3)2:6H2O
Zn(OH)2-a	-9.57	2.88	12.45	Zn(OH)2
Zn(OH)2-b	-8.87	2.88	11.75	Zn(OH)2
Zn(OH)2-c	-9.32	2.88	12.20	Zn(OH)2
Zn(OH)2-e	-8.62	2.88	11.50	Zn(OH)2
Zn(OH)2-g	-8.83	2.88	11.71	Zn(OH)2
Zn2(OH)2SO4	-12.46	-4.96	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-16.62	-1.42	15.20	Zn2(OH)3Cl
Zn3(AsO4)2:2.5w	-18.03	-45.57	-27.55	Zn3(AsO4)2:2.5H2O
Zn3O(SO4)2	-31.83	-12.81	19.02	ZnO:2ZnSO4
Zn4(OH)6SO4	-27.60	0.80	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-38.46	0.04	38.50	Zn5(OH)8Cl2
ZnCl2	-18.52	-11.49	7.03	ZnCl2
ZnMetal	-55.07	-29.32	25.76	Zn
ZnO(a)	-8.43	2.88	11.31	ZnO
ZnSO4:H2O	-7.28	-7.85	-0.57	ZnSO4:H2O

Initial solution 4. UGA4

-----Solution composition-----

Elements	Molality	Moles
Al	3.393e-003	3.393e-003
As	2.522e-004	2.522e-004
Ca	2.076e-002	2.076e-002
Cl	1.745e-003	1.745e-003
Cu	1.273e-003	1.273e-003
Fe	5.389e-003	5.389e-003
K	7.511e-003	7.511e-003
Mg	3.208e-003	3.208e-003
Mn	6.338e-004	6.338e-004
N(5)	6.145e-003	6.145e-003
Na	4.907e-003	4.907e-003
S(6)	2.406e-002	2.406e-002
Zn	1.260e-003	1.260e-003

-----Description of solution-----

pH	=	3.360
pe	=	12.000
Activity of water	=	0.999
Ionic strength	=	8.804e-002
Mass of water (kg)	=	1.000e+000
Total alkalinity (eq/kg)	=	-6.813e-003

Total carbon (mol/kg) = 0.000e+000
 Total CO2 (mol/kg) = 0.000e+000
 Temperature (deg C) = 25.000
 Electrical balance (eq) = 3.380e-002
 Percent error, 100*(Cat-|An|)/(Cat+|An|) = 34.68
 Iterations = 11
 Total H = 1.110165e+002
 Total O = 5.562470e+001

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma
H+	5.254e-004	4.365e-004	-3.279	-3.360	-0.081
OH-	2.904e-011	2.291e-011	-10.537	-10.640	-0.103
H2O	5.551e+001	9.988e-001	1.744	-0.001	0.000
Al	3.393e-003				
AlSO4+	2.091e-003	1.649e-003	-2.680	-2.783	-0.103
Al+3	1.004e-003	1.185e-004	-2.998	-3.926	-0.928
Al(SO4)2-	2.910e-004	2.296e-004	-3.536	-3.639	-0.103
AlOH+2	6.961e-006	2.694e-006	-5.157	-5.570	-0.412
AlHSO4+2	1.650e-007	6.384e-008	-6.783	-7.195	-0.412
Al(OH)2+	6.125e-008	4.831e-008	-7.213	-7.316	-0.103
Al(OH)3	1.596e-011	1.629e-011	-10.797	-10.788	0.009
Al(OH)4-	8.906e-014	7.024e-014	-13.050	-13.153	-0.103
As(3)	6.792e-017				
H3AsO3	6.790e-017	6.929e-017	-16.168	-16.159	0.009
H4AsO3+	1.900e-020	1.499e-020	-19.721	-19.824	-0.103
H2AsO3-	1.425e-022	1.124e-022	-21.846	-21.949	-0.103
HAsO3-2	1.327e-033	5.137e-034	-32.877	-33.289	-0.412
AsO3-3	0.000e+000	0.000e+000	-44.702	-45.629	-0.928
As(5)	2.522e-004				
H2AsO4-	2.362e-004	1.863e-004	-3.627	-3.730	-0.103
H3AsO4	1.590e-005	1.622e-005	-4.799	-4.790	0.009
HAsO4-2	7.630e-008	2.952e-008	-7.117	-7.530	-0.412
AsO4-3	1.282e-015	1.514e-016	-14.892	-15.820	-0.928
Ca	2.076e-002				
Ca+2	1.538e-002	6.236e-003	-1.813	-2.205	-0.392
CaSO4	5.366e-003	5.476e-003	-2.270	-2.262	0.009
CaHSO4+	1.776e-005	1.400e-005	-4.751	-4.854	-0.103
CaOH+	3.003e-012	2.368e-012	-11.522	-11.626	-0.103
Cl	1.745e-003				
Cl-	1.737e-003	1.344e-003	-2.760	-2.872	-0.111
FeCl+2	2.966e-006	1.148e-006	-5.528	-5.940	-0.412
CuCl+	1.683e-006	1.328e-006	-5.774	-5.877	-0.103
ZnCl+	1.564e-006	1.234e-006	-5.806	-5.909	-0.103
MnCl+	1.310e-006	1.033e-006	-5.883	-5.986	-0.103
FeCl+	6.964e-007	5.493e-007	-6.157	-6.260	-0.103
FeCl2+	8.735e-009	6.890e-009	-8.059	-8.162	-0.103
ZnCl2	1.701e-009	1.736e-009	-8.769	-8.760	0.009
CuCl2	9.391e-010	9.583e-010	-9.027	-9.018	0.009
MnCl2	5.941e-010	6.063e-010	-9.226	-9.217	0.009
ZnOHC1	3.403e-011	3.472e-011	-10.468	-10.459	0.009
ZnCl3-	3.319e-012	2.618e-012	-11.479	-11.582	-0.103
FeCl3	9.074e-013	9.260e-013	-12.042	-12.033	0.009
MnCl3-	2.845e-013	2.244e-013	-12.546	-12.649	-0.103
CuCl2-	1.395e-013	1.100e-013	-12.855	-12.958	-0.103
CuCl3-	5.794e-015	4.570e-015	-14.237	-14.340	-0.103
ZnCl4-2	4.557e-015	1.763e-015	-14.341	-14.754	-0.412
CuCl3-2	6.057e-016	2.344e-016	-15.218	-15.630	-0.412
CuCl4-2	7.955e-020	3.078e-020	-19.099	-19.512	-0.412
Cu(1)	3.844e-013				
Cu+	2.442e-013	1.926e-013	-12.612	-12.715	-0.103
CuCl2-	1.395e-013	1.100e-013	-12.855	-12.958	-0.103
CuCl3-2	6.057e-016	2.344e-016	-15.218	-15.630	-0.412
Cu(2)	1.273e-003				

Cu+2	9.486e-004	3.670e-004	-3.023	-3.435	-0.412
CuSO4	3.232e-004	3.298e-004	-3.491	-3.482	0.009
CuCl+	1.683e-006	1.328e-006	-5.774	-5.877	-0.103
CuOH+	1.065e-008	8.399e-009	-7.973	-8.076	-0.103
CuCl2	9.391e-010	9.583e-010	-9.027	-9.018	0.009
Cu2(OH)2+2	7.977e-011	3.087e-011	-10.098	-10.511	-0.412
Cu(OH)2	3.935e-011	4.015e-011	-10.405	-10.396	0.009
CuCl3-	5.794e-015	4.570e-015	-14.237	-14.340	-0.103
CuCl4-2	7.955e-020	3.078e-020	-19.099	-19.512	-0.412
Cu(OH)3-	7.019e-021	5.536e-021	-20.154	-20.257	-0.103
Cu(OH)4-2	6.532e-030	2.528e-030	-29.185	-29.597	-0.412
Fe(2)	9.938e-004				
Fe+2	7.651e-004	2.961e-004	-3.116	-3.529	-0.412
FeSO4	2.271e-004	2.317e-004	-3.644	-3.635	0.009
FeHSO4+	8.430e-007	6.649e-007	-6.074	-6.177	-0.103
FeCl+	6.964e-007	5.493e-007	-6.157	-6.260	-0.103
FeOH+	2.716e-010	2.142e-010	-9.566	-9.669	-0.103
Fe(OH)2	4.089e-018	4.172e-018	-17.388	-17.380	0.009
Fe(OH)3-	4.498e-025	3.547e-025	-24.347	-24.450	-0.103
Fe(3)	4.395e-003				
FeSO4+	1.730e-003	1.364e-003	-2.762	-2.865	-0.103
FeOH+2	1.080e-003	4.177e-004	-2.967	-3.379	-0.412
Fe(OH)2+	4.013e-004	3.165e-004	-3.397	-3.500	-0.103
Fe+3	2.394e-004	2.827e-005	-3.621	-4.549	-0.928
Fe2(OH)2+4	2.095e-004	4.697e-006	-3.679	-5.328	-1.649
Fe(SO4)2-	1.666e-004	1.314e-004	-3.778	-3.881	-0.103
Fe3(OH)4+5	1.173e-004	3.106e-007	-3.931	-6.508	-2.577
FeHSO4+2	4.122e-006	1.595e-006	-5.385	-5.797	-0.412
FeCl+2	2.966e-006	1.148e-006	-5.528	-5.940	-0.412
Fe(OH)3	9.143e-008	9.330e-008	-7.039	-7.030	0.009
FeCl2+	8.735e-009	6.890e-009	-8.059	-8.162	-0.103
FeCl3	9.074e-013	9.260e-013	-12.042	-12.033	0.009
Fe(OH)4-	2.469e-013	1.947e-013	-12.608	-12.711	-0.103
H(0)	2.644e-034				
H2	1.322e-034	1.349e-034	-33.879	-33.870	0.009
K	7.511e-003				
K+	7.290e-003	5.641e-003	-2.137	-2.249	-0.111
KSO4-	2.212e-004	1.744e-004	-3.655	-3.758	-0.103
Mg	3.208e-003				
Mg+2	2.251e-003	9.470e-004	-2.648	-3.024	-0.376
MgSO4	9.575e-004	9.771e-004	-3.019	-3.010	0.009
MgOH+	9.976e-012	7.868e-012	-11.001	-11.104	-0.103
Mn(2)	6.338e-004				
Mn+2	4.878e-004	1.887e-004	-3.312	-3.724	-0.412
MnSO4	1.448e-004	1.477e-004	-3.839	-3.831	0.009
MnCl+	1.310e-006	1.033e-006	-5.883	-5.986	-0.103
Mn(NO3)2	1.729e-008	1.765e-008	-7.762	-7.753	0.009
MnCl2	5.941e-010	6.063e-010	-9.226	-9.217	0.009
MnOH+	1.408e-011	1.110e-011	-10.852	-10.955	-0.103
MnCl3-	2.845e-013	2.244e-013	-12.546	-12.649	-0.103
Mn(OH)3-	4.544e-029	3.584e-029	-28.343	-28.446	-0.103
Mn(3)	4.939e-017				
Mn+3	4.939e-017	5.833e-018	-16.306	-17.234	-0.928
Mn(6)	0.000e+000				
MnO4-2	0.000e+000	0.000e+000	-46.874	-47.286	-0.412
Mn(7)	0.000e+000				
MnO4-	0.000e+000	0.000e+000	-44.567	-44.670	-0.103
N(5)	6.145e-003				
NO3-	6.145e-003	4.846e-003	-2.212	-2.315	-0.103
Mn(NO3)2	1.729e-008	1.765e-008	-7.762	-7.753	0.009
Na	4.907e-003				
Na+	4.801e-003	3.795e-003	-2.319	-2.421	-0.102
NaSO4-	1.061e-004	8.370e-005	-3.974	-4.077	-0.103
O(0)	4.479e-025				
O2	2.240e-025	2.286e-025	-24.650	-24.641	0.009
S(6)	2.406e-002				
SO4-2	1.131e-002	4.401e-003	-1.946	-2.356	-0.410

CaSO4	5.366e-003	5.476e-003	-2.270	-2.262	0.009
AlSO4+	2.091e-003	1.649e-003	-2.680	-2.783	-0.103
FeSO4+	1.730e-003	1.364e-003	-2.762	-2.865	-0.103
MgSO4	9.575e-004	9.771e-004	-3.019	-3.010	0.009
ZnSO4	3.447e-004	3.518e-004	-3.463	-3.454	0.009
CuSO4	3.232e-004	3.298e-004	-3.491	-3.482	0.009
Al(SO4)2-	2.910e-004	2.296e-004	-3.536	-3.639	-0.103
HSO4-	2.368e-004	1.868e-004	-3.626	-3.729	-0.103
FeSO4	2.271e-004	2.317e-004	-3.644	-3.635	0.009
KSO4-	2.212e-004	1.744e-004	-3.655	-3.758	-0.103
Fe(SO4)2-	1.666e-004	1.314e-004	-3.778	-3.881	-0.103
MnSO4	1.448e-004	1.477e-004	-3.839	-3.831	0.009
NaSO4-	1.061e-004	8.370e-005	-3.974	-4.077	-0.103
Zn(SO4)2-2	3.252e-005	1.259e-005	-4.488	-4.900	-0.412
CaHSO4+	1.776e-005	1.400e-005	-4.751	-4.854	-0.103
FeHSO4+2	4.122e-006	1.595e-006	-5.385	-5.797	-0.412
FeHSO4+	8.430e-007	6.649e-007	-6.074	-6.177	-0.103
AlHSO4+2	1.650e-007	6.384e-008	-6.783	-7.195	-0.412
Zn	1.260e-003				
Zn+2	8.812e-004	3.410e-004	-3.055	-3.467	-0.412
ZnSO4	3.447e-004	3.518e-004	-3.463	-3.454	0.009
Zn(SO4)2-2	3.252e-005	1.259e-005	-4.488	-4.900	-0.412
ZnCl+	1.564e-006	1.234e-006	-5.806	-5.909	-0.103
ZnCl2	1.701e-009	1.736e-009	-8.769	-8.760	0.009
ZnOH+	1.085e-009	8.555e-010	-8.965	-9.068	-0.103
ZnOHCl	3.403e-011	3.472e-011	-10.468	-10.459	0.009
ZnCl3-	3.319e-012	2.618e-012	-11.479	-11.582	-0.103
Zn(OH)2	2.203e-014	2.248e-014	-13.657	-13.648	0.009
ZnCl4-2	4.557e-015	1.763e-015	-14.341	-14.754	-0.412
Zn(OH)3-	2.062e-022	1.626e-022	-21.686	-21.789	-0.103
Zn(OH)4-2	1.524e-031	5.898e-032	-30.817	-31.229	-0.412

-----Saturation indices-----

Phase	SI	log IAP	log KT	
Al(OH)3(a)	-4.65	6.15	10.80	Al(OH)3
AlAsO4:2H2O	-3.91	-19.75	-15.84	AlAsO4:2H2O
AlumK	-5.72	-10.89	-5.17	KAl(SO4)2:12H2O
Alunite	2.82	1.42	-1.40	KAl3(SO4)2(OH)6
Anhydrite	-0.20	-4.56	-4.36	CaSO4
Antlerite	-7.51	0.78	8.29	Cu3(OH)4SO4
Arsenolite	-30.94	-32.32	-1.38	As2O3
As2O5(cr)	-17.81	-9.58	8.23	As2O5
As_native	-49.71	-62.24	-12.53	As
Atacamite	-7.00	0.34	7.34	Cu2(OH)3Cl
Basaluminite	-7.17	15.53	22.70	Al4(OH)10SO4
Bianchite	-4.06	-5.83	-1.76	ZnSO4:6H2O
Birnessite	-9.89	33.71	43.60	MnO2
Bixbyite	-13.70	-14.31	-0.61	Mn2O3
Boehmite	-2.43	6.15	8.58	AlOOH
Brochantite	-11.28	4.06	15.34	Cu4(OH)6SO4
Brucite	-13.14	3.70	16.84	Mg(OH)2
Ca3(AsO4)2:4w	-19.35	-38.26	-18.91	Ca3(AsO4)2:4H2O
Chalcanthite	-3.15	-5.79	-2.64	CuSO4:5H2O
Claudetite	-30.98	-32.32	-1.34	As2O3
Cu(OH)2	-5.36	3.28	8.64	Cu(OH)2
Cu2(OH)3NO3	-8.35	0.89	9.24	Cu2(OH)3NO3
Cu2SO4	-25.84	-27.79	-1.95	Cu2SO4
Cu3(AsO4)2:6w	-6.83	-41.95	-35.12	Cu3(AsO4)2:6H2O
CuMetal	-15.96	-24.72	-8.76	Cu
CuOCuSO4	-14.04	-2.51	11.53	CuO:CuSO4
CupricFerrite	8.47	14.35	5.88	CuFe2O4
Cuprite	-17.16	-18.71	-1.55	Cu2O
CuprousFerrite	5.10	-3.82	-8.92	CuFeO2
CuSO4	-8.80	-5.79	3.01	CuSO4
Diaspore	-0.73	6.15	6.88	AlOOH

Epsomite	-3.24	-5.38	-2.14	MgSO4:7H2O
Fe(OH)2.7Cl1.3	6.70	3.66	-3.04	Fe(OH)2.7Cl10.3
Fe(OH)3(a)	0.64	5.53	4.89	Fe(OH)3
Fe3(OH)8	-5.97	14.25	20.22	Fe3(OH)8
Gibbsite	-1.96	6.15	8.11	Al(OH)3
Goethite	6.53	5.53	-1.00	FeOOH
Goslarite	-3.87	-5.83	-1.96	ZnSO4:7H2O
Gypsum	0.02	-4.56	-4.58	CaSO4:2H2O
H2(g)	-30.72	-33.87	-3.15	H2
H2O(g)	-1.51	-0.00	1.51	H2O
Halite	-6.87	-5.29	1.58	NaCl
Hausmannite	-21.32	39.71	61.03	Mn3O4
Hematite	15.07	11.06	-4.01	Fe2O3
Jarosite(ss)	9.15	-0.68	-9.83	(K0.77Na0.03H0.2)Fe3(SO4)2(OH)6
Jarosite-K	8.76	-0.45	-9.21	KFe3(SO4)2(OH)6
Jarosite-Na	4.66	-0.62	-5.28	NaFe3(SO4)2(OH)6
JarositeH	3.83	-1.56	-5.39	(H3O)Fe3(SO4)2(OH)6
Jurbanite	0.31	-2.92	-3.23	AlOHSO4
Langite	-12.73	4.06	16.79	Cu4(OH)6SO4:H2O
Maghemite	4.68	11.06	6.39	Fe2O3
Magnetite	10.52	14.25	3.74	Fe3O4
Manganite	-6.99	18.35	25.34	MnOOH
Melanothallite	-12.91	-9.18	3.73	CuCl2
Melanterite	-3.68	-5.89	-2.21	FeSO4:7H2O
Mirabilite	-6.09	-7.20	-1.11	Na2SO4:10H2O
Mn2(SO4)3	-35.83	-41.54	-5.71	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-14.11	-42.82	-28.71	Mn3(AsO4)2:8H2O
MnCl2:4H2O	-12.18	-9.47	2.71	MnCl2:4H2O
MnSO4	-8.75	-6.08	2.67	MnSO4
Nantokite	-8.83	-15.59	-6.76	CuCl
Nsutite	-8.85	33.71	42.56	MnO2
O2(g)	-21.75	-24.64	-2.89	O2
Portlandite	-18.29	4.51	22.80	Ca(OH)2
Pyrochroite	-12.21	2.99	15.20	Mn(OH)2
Pyrolusite	-7.67	33.71	41.38	MnO2
Scorodite	-0.12	-20.37	-20.25	FeAsO4:2H2O
Tenorite	-4.34	3.28	7.62	CuO
Thenardite	-7.02	-7.20	-0.18	Na2SO4
Zincite(c)	-7.89	3.25	11.14	ZnO
Zincosite	-8.83	-5.82	3.01	ZnSO4
Zn(NO3)2:6H2O	-11.54	-8.10	3.44	Zn(NO3)2:6H2O
Zn(OH)2-a	-9.20	3.25	12.45	Zn(OH)2
Zn(OH)2-b	-8.50	3.25	11.75	Zn(OH)2
Zn(OH)2-c	-8.95	3.25	12.20	Zn(OH)2
Zn(OH)2-e	-8.25	3.25	11.50	Zn(OH)2
Zn(OH)2-g	-8.46	3.25	11.71	Zn(OH)2
Zn2(OH)2SO4	-10.07	-2.57	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-14.93	0.27	15.20	Zn2(OH)3Cl
Zn3(AsO4)2:2.5w	-14.50	-42.04	-27.55	Zn3(AsO4)2:2.5H2O
Zn3O(SO4)2	-27.42	-8.40	19.02	ZnO:2ZnSO4
Zn4(OH)6SO4	-24.47	3.93	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-34.70	3.80	38.50	Zn5(OH)8Cl2
ZnCl2	-16.24	-9.21	7.03	ZnCl2
ZnMetal	-53.22	-27.47	25.76	Zn
ZnO(a)	-8.06	3.25	11.31	ZnO
ZnSO4:H2O	-5.25	-5.82	-0.57	ZnSO4:H2O

Beginning of batch-reaction calculations.

Reaction step 1.

Using mix 1.

Mixture 1.

6.000e-001 Solution 1 UGA1
 2.500e-001 Solution 2 UGA2
 1.000e-001 Solution 3 UGA3
 5.000e-002 Solution 4 UGA4

-----Solution composition-----

Elements	Molality	Moles
Al	4.296e-004	4.296e-004
As	2.233e-005	2.233e-005
Ca	1.956e-003	1.956e-003
Cl	1.310e-003	1.310e-003
Cu	3.345e-004	3.345e-004
Fe	2.391e-003	2.391e-003
K	7.739e-004	7.739e-004
Mg	3.538e-004	3.538e-004
Mn	2.566e-004	2.566e-004
N	3.640e-003	3.640e-003
Na	8.468e-004	8.468e-004
S	8.648e-003	8.648e-003
Zn	8.008e-005	8.008e-005

-----Description of solution-----

pH	=	3.098	Charge balance
pe	=	16.914	Adjusted to redox equilibrium
Activity of water	=	1.000	
Ionic strength	=	2.260e-002	
Mass of water (kg)	=	1.000e+000	
Total alkalinity (eq/kg)	=	-5.118e-003	
Total carbon (mol/kg)	=	0.000e+000	
Total CO2 (mol/kg)	=	0.000e+000	
Temperature (deg C)	=	25.000	
Electrical balance (eq)	=	-5.780e-003	
Percent error, 100*(Cat- An)/(Cat+ An)	=	-21.42	
Iterations	=	11	
Total H	=	1.110148e+002	
Total O	=	5.555249e+001	

-----Distribution of species-----

Species	Molality	Activity	Log Molality	Log Activity	Log Gamma
H+	9.016e-004	7.980e-004	-3.045	-3.098	-0.053
OH-	1.450e-011	1.254e-011	-10.839	-10.902	-0.063
H2O	5.551e+001	9.997e-001	1.744	-0.000	0.000
Al	4.296e-004				
AlSO4+	3.018e-004	2.610e-004	-3.520	-3.583	-0.063
Al+3	9.719e-005	2.628e-005	-4.012	-4.580	-0.568
Al(SO4)2-	2.997e-005	2.592e-005	-4.523	-4.586	-0.063
AlOH+2	5.849e-007	3.271e-007	-6.233	-6.485	-0.252
AlHSO4+2	3.302e-008	1.847e-008	-7.481	-7.734	-0.252
Al(OH)2+	3.714e-009	3.212e-009	-8.430	-8.493	-0.063
Al(OH)3	5.897e-013	5.928e-013	-12.229	-12.227	0.002
Al(OH)4-	1.619e-015	1.400e-015	-14.791	-14.854	-0.063
As(3)	5.701e-027				
H3AsO3	5.698e-027	5.728e-027	-26.244	-26.242	0.002
H4AsO3+	2.619e-030	2.265e-030	-29.582	-29.645	-0.063
H2AsO3-	5.877e-033	5.082e-033	-32.231	-32.294	-0.063
HAsO3-2	0.000e+000	0.000e+000	-43.644	-43.896	-0.252
AsO3-3	0.000e+000	0.000e+000	-55.930	-56.498	-0.568
AsS(OH)(HS)-	0.000e+000	0.000e+000	-275.227	-275.290	-0.063
As3S4(HS)2-	0.000e+000	0.000e+000	-813.803	-813.866	-0.063
As(5)	2.233e-005				
H2AsO4-	1.963e-005	1.698e-005	-4.707	-4.770	-0.063

	H3AsO4	2.689e-006	2.703e-006	-5.570	-5.568	0.002
	HAsO4-2	2.632e-009	1.472e-009	-8.580	-8.832	-0.252
	AsO4-3	1.527e-017	4.130e-018	-16.816	-17.384	-0.568
Ca	1.956e-003					
	Ca+2	1.439e-003	8.246e-004	-2.842	-3.084	-0.242
	CaSO4	5.140e-004	5.167e-004	-3.289	-3.287	0.002
	CaHSO4+	2.793e-006	2.415e-006	-5.554	-5.617	-0.063
	CaOH+	1.983e-013	1.715e-013	-12.703	-12.766	-0.063
Cl	1.310e-003					
	Cl-	1.306e-003	1.125e-003	-2.884	-2.949	-0.065
	FeCl+2	2.192e-006	1.226e-006	-5.659	-5.912	-0.252
	MnCl+	5.788e-007	5.005e-007	-6.237	-6.301	-0.063
	CuCl+	4.820e-007	4.168e-007	-6.317	-6.380	-0.063
	ZnCl+	1.096e-007	9.479e-008	-6.960	-7.023	-0.063
	FeCl2+	7.122e-009	6.159e-009	-8.147	-8.210	-0.063
	CuCl2	2.505e-010	2.518e-010	-9.601	-9.599	0.002
	MnCl2	2.445e-010	2.458e-010	-9.612	-9.609	0.002
	ZnCl2	1.111e-010	1.117e-010	-9.954	-9.952	0.002
	FeCl+	8.270e-012	7.152e-012	-11.082	-11.146	-0.063
	ZnOHCl	1.453e-012	1.461e-012	-11.838	-11.835	0.002
	FeCl3	6.892e-013	6.928e-013	-12.162	-12.159	0.002
	ZnCl3-	1.630e-013	1.409e-013	-12.788	-12.851	-0.063
	MnCl3-	8.806e-014	7.615e-014	-13.055	-13.118	-0.063
	CuCl3-	1.162e-015	1.005e-015	-14.935	-14.998	-0.063
	ZnCl4-2	1.421e-016	7.946e-017	-15.847	-16.100	-0.252
	CuCl2-	4.075e-019	3.524e-019	-18.390	-18.453	-0.063
	CuCl4-2	1.013e-020	5.666e-021	-19.994	-20.247	-0.252
	CuCl3-2	1.124e-021	6.283e-022	-20.949	-21.202	-0.252
Cu(1)	1.427e-018					
	Cu+	1.018e-018	8.807e-019	-17.992	-18.055	-0.063
	CuCl2-	4.075e-019	3.524e-019	-18.390	-18.453	-0.063
	CuCl3-2	1.124e-021	6.283e-022	-20.949	-21.202	-0.252
Cu(2)	3.345e-004					
	Cu+2	2.462e-004	1.377e-004	-3.609	-3.861	-0.252
	CuSO4	8.780e-005	8.826e-005	-4.056	-4.054	0.002
	CuCl+	4.820e-007	4.168e-007	-6.317	-6.380	-0.063
	CuOH+	1.994e-009	1.725e-009	-8.700	-8.763	-0.063
	CuCl2	2.505e-010	2.518e-010	-9.601	-9.599	0.002
	Cu(OH)2	4.491e-012	4.514e-012	-11.348	-11.345	0.002
	Cu2(OH)2+2	2.327e-012	1.301e-012	-11.633	-11.886	-0.252
	CuCl3-	1.162e-015	1.005e-015	-14.935	-14.998	-0.063
	CuCl4-2	1.013e-020	5.666e-021	-19.994	-20.247	-0.252
	Cu(OH)3-	3.940e-022	3.407e-022	-21.404	-21.468	-0.063
	Cu(OH)4-2	1.523e-031	8.517e-032	-30.817	-31.070	-0.252
	Cu(HS)3-	0.000e+000	0.000e+000	-373.881	-373.944	-0.063
Fe(2)	1.082e-008					
	Fe+2	8.236e-009	4.606e-009	-8.084	-8.337	-0.252
	FeSO4	2.559e-009	2.572e-009	-8.592	-8.590	0.002
	FeHSO4+	1.560e-011	1.349e-011	-10.807	-10.870	-0.063
	FeCl+	8.270e-012	7.152e-012	-11.082	-11.146	-0.063
	FeOH+	2.110e-015	1.825e-015	-14.676	-14.739	-0.063
	Fe(OH)2	1.935e-023	1.946e-023	-22.713	-22.711	0.002
	Fe(OH)3-	1.047e-030	9.056e-031	-29.980	-30.043	-0.063
	Fe(HS)2	0.000e+000	0.000e+000	-263.377	-263.375	0.002
	Fe(HS)3-	0.000e+000	0.000e+000	-393.269	-393.332	-0.063
Fe(3)	2.391e-003					
	FeSO4+	1.437e-003	1.242e-003	-2.843	-2.906	-0.063
	FeOH+2	5.219e-004	2.918e-004	-3.282	-3.535	-0.252
	Fe(OH)2+	1.400e-004	1.211e-004	-3.854	-3.917	-0.063
	Fe+3	1.334e-004	3.608e-005	-3.875	-4.443	-0.568
	Fe(SO4)2-	9.870e-005	8.535e-005	-4.006	-4.069	-0.063
	Fe2(OH)2+4	2.344e-005	2.293e-006	-4.630	-5.640	-1.010
	FeHSO4+2	4.747e-006	2.655e-006	-5.324	-5.576	-0.252
	Fe3(OH)4+5	2.193e-006	5.799e-008	-5.659	-7.237	-1.578
	FeCl+2	2.192e-006	1.226e-006	-5.659	-5.912	-0.252
	Fe(OH)3	1.944e-008	1.954e-008	-7.711	-7.709	0.002
	FeCl2+	7.122e-009	6.159e-009	-8.147	-8.210	-0.063

FeCl3	6.892e-013	6.928e-013	-12.162	-12.159	0.002
Fe(OH)4-	2.582e-014	2.232e-014	-13.588	-13.651	-0.063
H(0)	0.000e+000				
H2	0.000e+000	0.000e+000	-43.176	-43.174	0.002
K	7.739e-004				
K+	7.573e-004	6.521e-004	-3.121	-3.186	-0.065
KSO4-	1.664e-005	1.439e-005	-4.779	-4.842	-0.063
Mg	3.538e-004				
Mg+2	2.483e-004	1.441e-004	-3.605	-3.841	-0.236
MgSO4	1.055e-004	1.061e-004	-3.977	-3.974	0.002
MgOH+	7.579e-013	6.554e-013	-12.120	-12.184	-0.063
Mn(2)	2.566e-004				
Mn+2	1.953e-004	1.092e-004	-3.709	-3.962	-0.252
MnSO4	6.067e-005	6.099e-005	-4.217	-4.215	0.002
MnCl+	5.788e-007	5.005e-007	-6.237	-6.301	-0.063
Mn(NO3)2	4.036e-009	4.057e-009	-8.394	-8.392	0.002
MnCl2	2.445e-010	2.458e-010	-9.612	-9.609	0.002
MnOH+	4.067e-012	3.517e-012	-11.391	-11.454	-0.063
MnCl3-	8.806e-014	7.615e-014	-13.055	-13.118	-0.063
Mn(OH)3-	3.936e-030	3.404e-030	-29.405	-29.468	-0.063
Mn(3)	1.024e-012				
Mn+3	1.024e-012	2.769e-013	-11.990	-12.558	-0.568
Mn(6)	1.951e-030				
MnO4-2	1.951e-030	1.091e-030	-29.710	-29.962	-0.252
Mn(7)	4.275e-023				
MnO4-	4.275e-023	3.697e-023	-22.369	-22.432	-0.063
N(-3)	0.000e+000				
NH4+	0.000e+000	0.000e+000	-49.667	-49.730	-0.063
NH4SO4-	0.000e+000	0.000e+000	-51.060	-51.123	-0.063
NH3	0.000e+000	0.000e+000	-55.878	-55.876	0.002
N(0)	1.080e-004				
N2	5.400e-005	5.429e-005	-4.268	-4.265	0.002
N(3)	1.242e-014				
NO2-	1.242e-014	1.074e-014	-13.906	-13.969	-0.063
N(5)	3.532e-003				
NO3-	3.532e-003	3.055e-003	-2.452	-2.515	-0.063
Mn(NO3)2	4.036e-009	4.057e-009	-8.394	-8.392	0.002
Na	8.468e-004				
Na+	8.336e-004	7.223e-004	-3.079	-3.141	-0.062
NaSO4-	1.315e-005	1.137e-005	-4.881	-4.944	-0.063
O(0)	1.847e-006				
O2	9.236e-007	9.284e-007	-6.035	-6.032	0.002
S(-2)	0.000e+000				
H2S	0.000e+000	0.000e+000	-128.153	-128.151	0.002
HS-	0.000e+000	0.000e+000	-131.931	-131.994	-0.063
S5-2	0.000e+000	0.000e+000	-138.299	-138.491	-0.192
S4-2	0.000e+000	0.000e+000	-138.520	-138.725	-0.205
S6-2	0.000e+000	0.000e+000	-138.596	-138.777	-0.181
S-2	0.000e+000	0.000e+000	-141.562	-141.814	-0.252
S3-2	0.000e+000	0.000e+000	-141.959	-142.178	-0.220
S2-2	0.000e+000	0.000e+000	-143.192	-143.424	-0.232
Zn(HS)2	0.000e+000	0.000e+000	-253.555	-253.553	0.002
Fe(HS)2	0.000e+000	0.000e+000	-263.377	-263.375	0.002
AsS(OH)(HS)-	0.000e+000	0.000e+000	-275.227	-275.290	-0.063
Cu(HS)3-	0.000e+000	0.000e+000	-373.881	-373.944	-0.063
Zn(HS)3-	0.000e+000	0.000e+000	-384.324	-384.387	-0.063
Fe(HS)3-	0.000e+000	0.000e+000	-393.269	-393.332	-0.063
As3S4(HS)2-	0.000e+000	0.000e+000	-813.803	-813.866	-0.063
S(6)	8.648e-003				
SO4-2	5.540e-003	3.140e-003	-2.256	-2.503	-0.247
FeSO4+	1.437e-003	1.242e-003	-2.843	-2.906	-0.063
CaSO4	5.140e-004	5.167e-004	-3.289	-3.287	0.002
AlSO4+	3.018e-004	2.610e-004	-3.520	-3.583	-0.063
HSO4-	2.817e-004	2.436e-004	-3.550	-3.613	-0.063
MgSO4	1.055e-004	1.061e-004	-3.977	-3.974	0.002
Fe(SO4)2-	9.870e-005	8.535e-005	-4.006	-4.069	-0.063
CuSO4	8.780e-005	8.826e-005	-4.056	-4.054	0.002

MnSO4	6.067e-005	6.099e-005	-4.217	-4.215	0.002
Al(SO4)2-	2.997e-005	2.592e-005	-4.523	-4.586	-0.063
ZnSO4	2.293e-005	2.305e-005	-4.640	-4.637	0.002
KSO4-	1.664e-005	1.439e-005	-4.779	-4.842	-0.063
NaSO4-	1.315e-005	1.137e-005	-4.881	-4.944	-0.063
FeHSO4+2	4.747e-006	2.655e-006	-5.324	-5.576	-0.252
CaHSO4+	2.793e-006	2.415e-006	-5.554	-5.617	-0.063
Zn(SO4)2-2	1.052e-006	5.883e-007	-5.978	-6.230	-0.252
AlHSO4+2	3.302e-008	1.847e-008	-7.481	-7.734	-0.252
FeSO4	2.559e-009	2.572e-009	-8.592	-8.590	0.002
FeHSO4+	1.560e-011	1.349e-011	-10.807	-10.870	-0.063
NH4SO4-	0.000e+000	0.000e+000	-51.060	-51.123	-0.063
Zn	8.008e-005				
Zn+2	5.599e-005	3.131e-005	-4.252	-4.504	-0.252
ZnSO4	2.293e-005	2.305e-005	-4.640	-4.637	0.002
Zn(SO4)2-2	1.052e-006	5.883e-007	-5.978	-6.230	-0.252
ZnCl+	1.096e-007	9.479e-008	-6.960	-7.023	-0.063
ZnCl2	1.111e-010	1.117e-010	-9.954	-9.952	0.002
ZnOH+	4.973e-011	4.301e-011	-10.303	-10.366	-0.063
ZnOHCl	1.453e-012	1.461e-012	-11.838	-11.835	0.002
ZnCl3-	1.630e-013	1.409e-013	-12.788	-12.851	-0.063
Zn(OH)2	6.154e-016	6.186e-016	-15.211	-15.209	0.002
ZnCl4-2	1.421e-016	7.946e-017	-15.847	-16.100	-0.252
Zn(OH)3-	2.834e-024	2.451e-024	-23.548	-23.611	-0.063
Zn(OH)4-2	8.701e-034	4.866e-034	-33.060	-33.313	-0.252
Zn(HS)2	0.000e+000	0.000e+000	-253.555	-253.553	0.002
Zn(HS)3-	0.000e+000	0.000e+000	-384.324	-384.387	-0.063

-----Saturation indices-----

Phase	SI	log IAP	log KT	
Al(OH)3(a)	-6.09	4.71	10.80	Al(OH)3
AlAsO4:2H2O	-6.13	-21.96	-15.84	AlAsO4:2H2O
AlumK	-7.60	-12.77	-5.17	KAl(SO4)2:12H2O
Alunite	-1.95	-3.35	-1.40	KAl3(SO4)2(OH)6
Anhydrite	-1.23	-5.59	-4.36	CaSO4
Anilite	-125.07	-156.94	-31.88	Cu0.25Cu1.5S
Antlerite	-9.99	-1.70	8.29	Cu3(OH)4SO4
Arsenolite	-51.10	-52.48	-1.38	As2O3
As2O5(cr)	-19.36	-11.14	8.23	As2O5
As2S3(am)	-412.86	-457.76	-44.90	As2S3
As_native	-73.75	-86.28	-12.53	As
Atacamite	-8.72	-1.38	7.34	Cu2(OH)3Cl
Basaluminite	-12.55	10.15	22.70	Al4(OH)10SO4
Bianchite	-5.24	-7.01	-1.76	ZnSO4:6H2O
Birnessite	-1.34	42.26	43.60	MnO2
Bixbyite	-5.92	-6.53	-0.61	Mn2O3
BlaubleiI	-111.82	-135.98	-24.16	Cu0.9Cu0.2S
BlaubleiII	-118.38	-145.66	-27.28	Cu0.6Cu0.8S
Boehmite	-3.87	4.71	8.58	AlOOH
Brochantite	-14.70	0.64	15.34	Cu4(OH)6SO4
Brucite	-14.49	2.35	16.84	Mg(OH)2
Ca3(AsO4)2:4w	-25.11	-44.02	-18.91	Ca3(AsO4)2:4H2O
Chalcanthite	-3.72	-6.36	-2.64	CuSO4:5H2O
Chalcocite	-130.39	-165.01	-34.62	Cu2S
Chalcopyrite	-234.72	-269.99	-35.27	CuFeS2
Claudetite	-51.14	-52.48	-1.34	As2O3
Covellite	-110.49	-132.76	-22.27	CuS
Cu(OH)2	-6.31	2.33	8.64	Cu(OH)2
Cu2(OH)3NO3	-10.18	-0.94	9.24	Cu2(OH)3NO3
Cu2SO4	-36.66	-38.61	-1.95	Cu2SO4
Cu3(AsO4)2:6w	-11.23	-46.35	-35.12	Cu3(AsO4)2:6H2O
CuMetal	-26.21	-34.97	-8.76	Cu
CuOCuSO4	-15.56	-4.03	11.53	CuO:CuSO4
CupricFerrite	6.16	12.04	5.88	CuFe2O4
Cuprite	-28.36	-29.91	-1.55	Cu2O

CuprousFerrite	-1.19	-10.11	-8.92	CuFeO2
CuSO4	-9.37	-6.36	3.01	CuSO4
Diaspore	-2.17	4.71	6.88	AlOOH
Djurleite	-128.96	-162.88	-33.92	Cu0.066Cu1.868S
Epsomite	-4.21	-6.35	-2.14	MgSO4:7H2O
Fe(OH)2.7Cl.3	6.08	3.04	-3.04	Fe(OH)2.7Cl0.3
Fe(OH)3(a)	-0.04	4.85	4.89	Fe(OH)3
Fe3(OH)8	-12.66	7.56	20.22	Fe3(OH)8
FeS(ppt)	-133.32	-137.23	-3.92	FeS
Gibbsite	-3.40	4.71	8.11	Al(OH)3
Goethite	5.85	4.85	-1.00	FeOOH
Goslarite	-5.05	-7.01	-1.96	ZnSO4:7H2O
Greigite	-487.77	-532.81	-45.03	Fe3S4
Gypsum	-1.01	-5.59	-4.58	CaSO4:2H2O
H2(g)	-40.02	-43.17	-3.15	H2
H2O(g)	-1.51	-0.00	1.51	H2O
H2S(g)	-127.15	-128.15	-1.00	H2S
Halite	-7.67	-6.09	1.58	NaCl
Hausmannite	-14.30	46.73	61.03	Mn3O4
Hematite	13.71	9.70	-4.01	Fe2O3
Jarosite(ss)	6.92	-2.91	-9.83	(K0.77Na0.03H0.2)Fe3(SO4)2(OH)6
Jarosite-K	6.28	-2.93	-9.21	KFe3(SO4)2(OH)6
Jarosite-Na	2.39	-2.89	-5.28	NaFe3(SO4)2(OH)6
JarositeH	2.54	-2.85	-5.39	(H3O)Fe3(SO4)2(OH)6
Jurbanite	-0.76	-3.99	-3.23	AlOHSO4
Langite	-16.15	0.64	16.79	Cu4(OH)6SO4:H2O
Mackinawite	-132.58	-137.23	-4.65	FeS
Maghemite	3.32	9.70	6.39	Fe2O3
Magnetite	3.82	7.56	3.74	Fe3O4
Manganite	-3.09	22.25	25.34	MnOOH
Melanothallite	-13.49	-9.76	3.73	CuCl2
Melanterite	-8.63	-10.84	-2.21	FeSO4:7H2O
Mirabilite	-7.67	-8.79	-1.11	Na2SO4:10H2O
Mn2(SO4)3	-26.91	-32.62	-5.71	Mn2(SO4)3
Mn3(AsO4)2:8H2O	-17.95	-46.65	-28.71	Mn3(AsO4)2:8H2O
MnCl2:4H2O	-12.57	-9.86	2.71	MnCl2:4H2O
MnS(Green)	-136.66	-132.86	3.80	MnS
MnSO4	-9.13	-6.46	2.67	MnSO4
N2(g)	-1.01	-4.27	-3.26	N2
Nantokite	-14.24	-21.00	-6.76	CuCl
NH3(g)	-57.65	-55.88	1.77	NH3
Nsutite	-0.31	42.26	42.56	MnO2
O2(g)	-3.14	-6.03	-2.89	O2
Orpiment	-411.46	-457.76	-46.30	As2S3
Portlandite	-19.69	3.11	22.80	Ca(OH)2
Pyrite	-213.82	-232.30	-18.48	FeS2
Pyrochroite	-12.97	2.23	15.20	Mn(OH)2
Pyrolusite	0.88	42.26	41.38	MnO2
Realgar	-161.40	-181.35	-19.94	AsS
Scorodite	-1.58	-21.83	-20.25	FeAsO4:2H2O
Sphalerite	-121.78	-133.40	-11.62	ZnS
Sulfur	-92.96	-107.99	-15.03	S
Tenorite	-5.29	2.33	7.62	CuO
Thenardite	-8.61	-8.79	-0.18	Na2SO4
Wurtzite	-123.72	-133.40	-9.68	ZnS
Zincite(c)	-9.45	1.69	11.14	ZnO
Zincosite	-10.02	-7.01	3.01	ZnSO4
Zn(NO3)2:6H2O	-12.98	-9.54	3.44	Zn(NO3)2:6H2O
Zn(OH)2-a	-10.76	1.69	12.45	Zn(OH)2
Zn(OH)2-b	-10.06	1.69	11.75	Zn(OH)2
Zn(OH)2-c	-10.51	1.69	12.20	Zn(OH)2
Zn(OH)2-e	-9.81	1.69	11.50	Zn(OH)2
Zn(OH)2-g	-10.02	1.69	11.71	Zn(OH)2
Zn2(OH)2SO4	-12.82	-5.32	7.50	Zn2(OH)2SO4
Zn2(OH)3Cl	-17.86	-2.66	15.20	Zn2(OH)3Cl
Zn3(AsO4)2:2.5w	-20.74	-48.28	-27.55	Zn3(AsO4)2:2.5H2O
Zn3O(SO4)2	-31.34	-12.32	19.02	ZnO:2ZnSO4

Zn4(OH)6SO4	-30.33	-1.93	28.40	Zn4(OH)6SO4
Zn5(OH)8Cl2	-42.14	-3.64	38.50	Zn5(OH)8Cl2
ZnCl2	-17.43	-10.40	7.03	ZnCl2
ZnMetal	-64.09	-38.33	25.76	Zn
ZnO(a)	-9.62	1.69	11.31	ZnO
ZnS(a)	-124.35	-133.40	-9.05	ZnS
ZnSO4:H2O	-6.44	-7.01	-0.57	ZnSO4:H2O

End of simulation.

Reading input data for simulation 2.

End of run.
