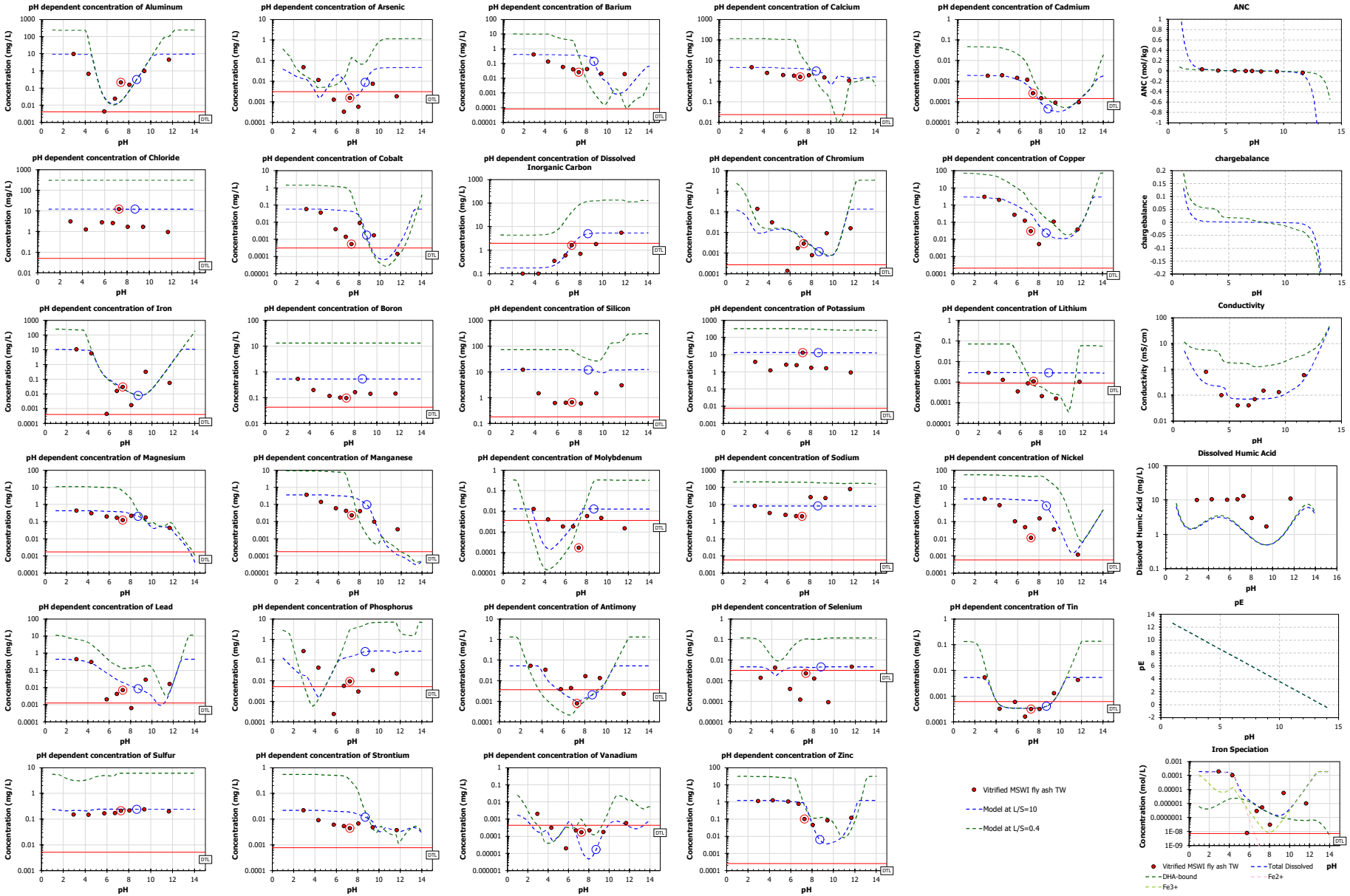
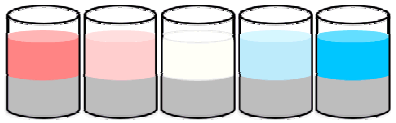
VITRIFIED MSWI FLY ASH

COMPARISON pH DEPENDENCE WITH MODEL



Object pH Dependent Leaching Test Model
Name Vitrified MSWI Fly ash TW

pH Dependent Leaching Test Scenario



Lab Test

Extra L/S Simulation

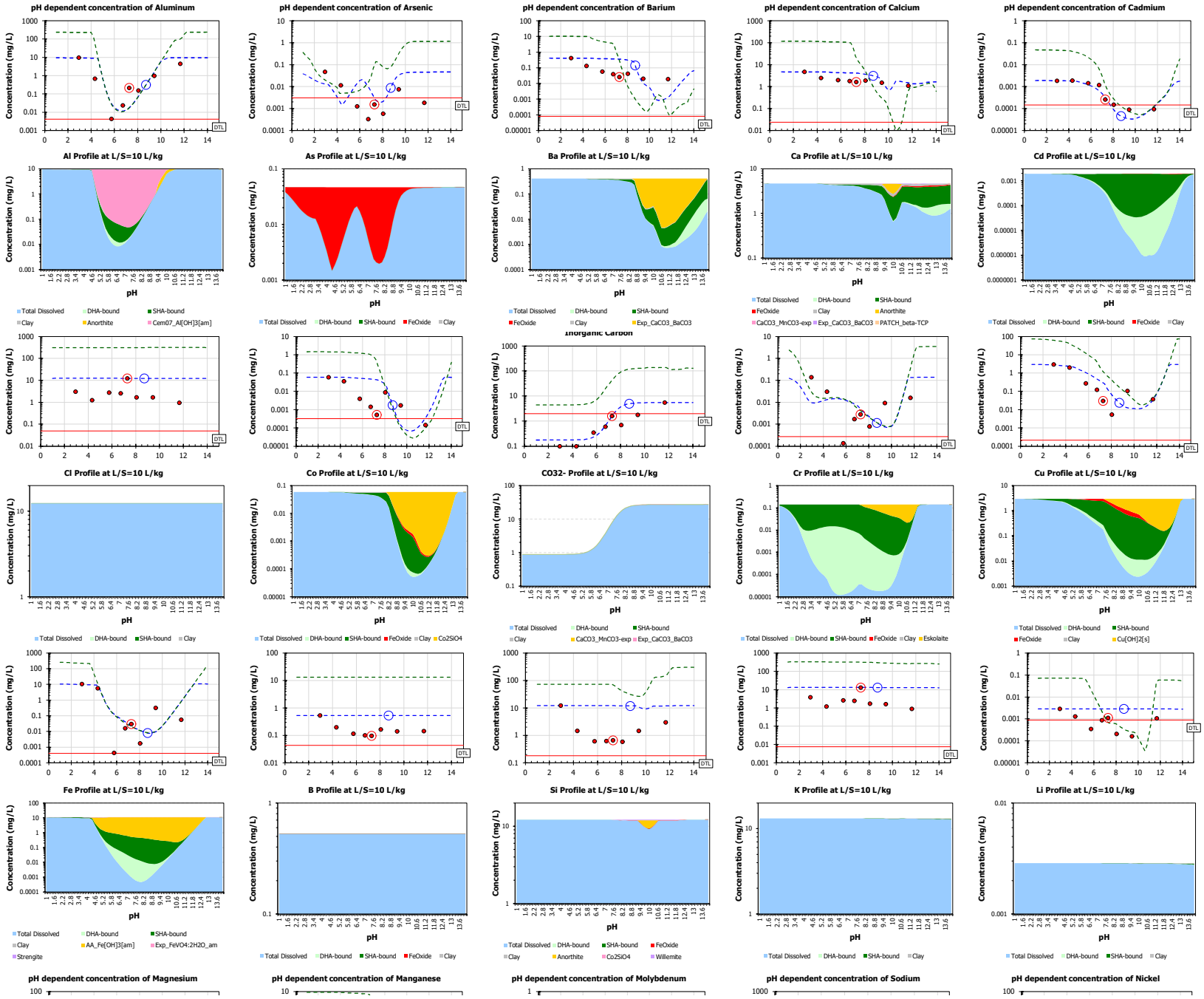
Lab Test

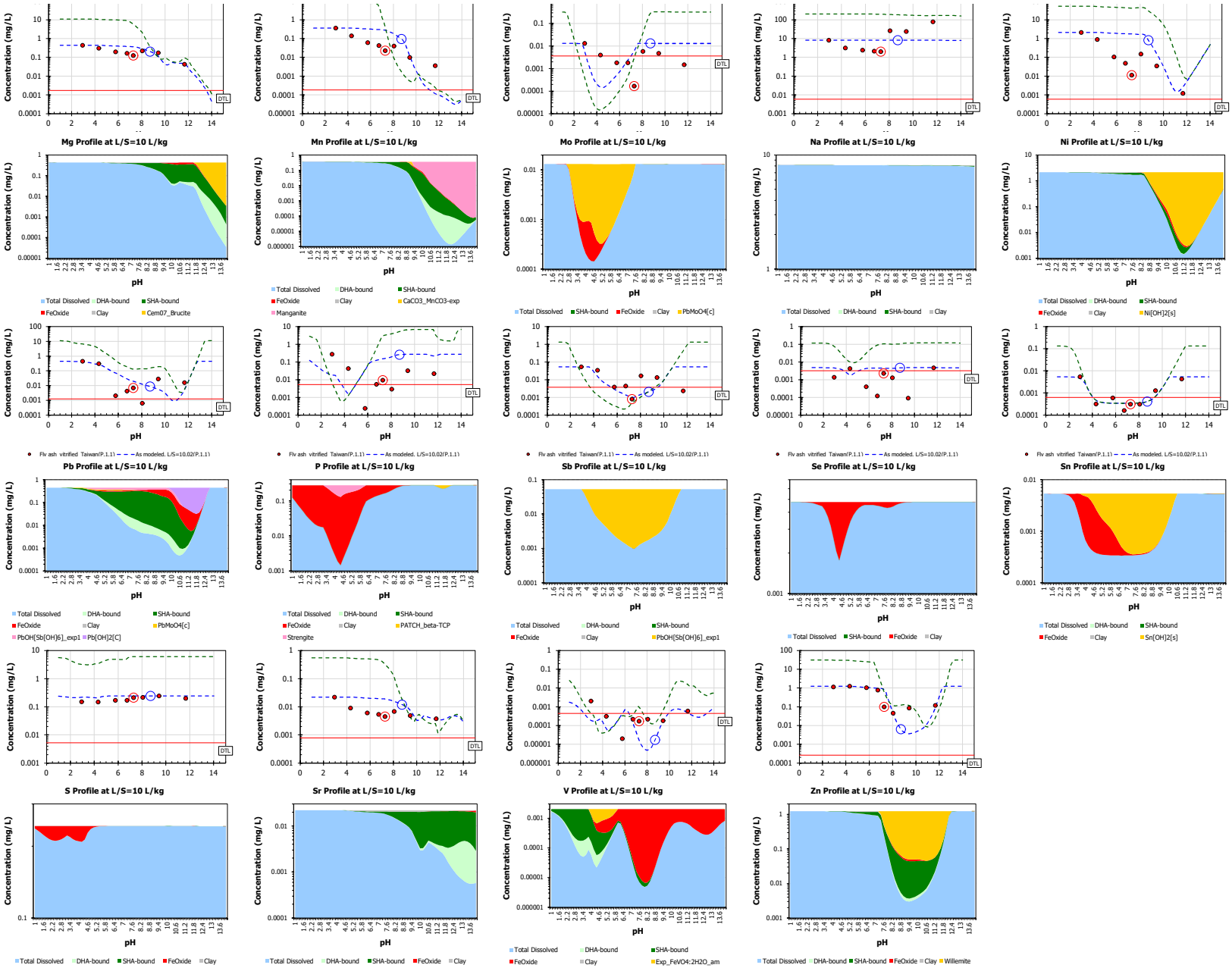
Model Parameters

Entity	Unit	Default	Available Content Entity	mg/kg	Entity	mg/kg	Entity	mg/kg
c0		-3.484	Al	96.03	Fe	107.7	P	2.743
c1		-3.047	As	0.4709	B	5.293	Sb	0.5287
c2		1.221	Ba	4.159	Si	122.1	Se	0.04775
c3		-0.2073	Br	7.990E-09	Hg	2.006E-08	Sn	0.05350
c4		0.01534	Ca	47.32	K	132.1	S	2.430
c5		-0.0004075	Cd	0.01920	Li	0.02880	Sr	0.2204
Clay	mg/kg	1000	Cl	124.3	Mg	4.381	Th	2.320E-08
Hydrous Ferric Oxide	mg/kg	60.00	Co	0.5856	Mn	3.662	U	2.380E-08
L/S	L/kg	10.02	CO32-	275.0	Mo	0.1313	V	0.02030
pE		6.330	Cr	1.394	Na	81.78	Zn	12.46
pH		7.270	Cu	29.63	Ni	21.41		
Solid Humic Acid	mg/kg	300.0	F	1.900E-09	Pb	4.453		
Simulated Low L/S	L/kg	0.4000						

Minerals

Name	Log(K)	Reaction
AA_Fe[OH]3[am]	16.60	AA_Fe[OH]3[am] + 1 H2O -> 1 Fe[OH]4- + 1 H+
Anorthite	63.81	Anorthite + 8 H2O -> 2 Al[OH]4- + 1 Ca+2 + 4 H+ + 2 H2SiO4-2
Arsenocrandallite-therm	95.56	Arsenocrandallite-therm + 6 H2O -> 3 Al[OH]4- + 2 AsO4-3 + 1 Ca+2 + 7 H+
Ba[SCr]O4[96%SO4]	9.790	Ba[SCr]O4[96%SO4] -> 1 Ba+2 + 0.04 CrO4-2 + 0.96 SO4-2
CaCO3_Li2CO3	21.30	CaCO3_Li2CO3 -> 2 CO3-2 + 1 Ca+2 + 2 Li+
CaCO3_MgCO3-exp	18.02	CaCO3_MgCO3-exp -> 2 CO3-2 + 1 Ca+2 + 1 Mg+2
CaCO3_MnCO3-exp	20.78	CaCO3_MnCO3-exp -> 2 CO3-2 + 1 Ca+2 + 1 Mn+2
CaCO3_SrCO3	19.85	CaCO3_SrCO3 -> 2 CO3-2 + 1 Ca+2 + 1 Sr+2
Cem07_Al[OH]3[am]	13.76	Cem07_Al[OH]3[am] + 1 H2O -> 1 Al[OH]4- + 1 H+
Cem07_Brucite	-16.83	Cem07_Brucite + 2 H+ -> 2 H2O + 1 Mg+2
Cem07_C4FcH12	-20.47	Cem07_C4FcH12 + 4 H+ -> 1 CO3-2 + 4 Ca+2 + 2 Fe[OH]4- + 10 H2O
Cem07_Calcite	8.485	Cem07_Calcite -> 1 CO3-2 + 1 Ca+2
Cem07_SiO2[am]	24.21	Cem07_SiO2[am] + 2 H2O -> 2 H+ + 1 H2SiO4-2
Co2SiO4	6.289	Co2SiO4 + 2 H+ -> 2 Co+2 + 1 H2SiO4-2
Cu[OH]2[s]	-8.640	Cu[OH]2[s] + 2 H+ -> 1 Cu+2 + 2 H2O
Eskolaite	139.5	Eskolaite + 5 H2O -> 2 CrO4-2 + 10 H+ + 6 e-
Exp_CaCO3_BaCO3	21.30	Exp_CaCO3_BaCO3 -> 1 Ba+2 + 2 CO3-2 + 1 Ca+2
Exp_FeVO4:2H2O_am	23.48	Exp_FeVO4:2H2O_am + 2 H2O -> 1 Fe[OH]4- + 1 VO2+
Li-Albite[low2]	86.27	Li-Albite[low2] + 8 H2O -> 1 Al[OH]4- + 6 H+ + 3 H2SiO4-2 + 1 Li+
Manganite	-25.27	Manganite + 3 H+ + 1 e- -> 2 H2O + 1 Mn+2
Ni[OH]2[s]	-10.80	Ni[OH]2[s] + 2 H+ -> 2 H2O + 1 Ni+2
PATCH_beta-TCP	28.93	PATCH_beta-TCP -> 3 Ca+2 + 2 PO4-3
Pb[OH]2[C]	-8.150	Pb[OH]2[C] + 2 H+ -> 2 H2O + 1 Pb+2
PbMoO4[c]	15.80	PbMoO4[c] -> 1 MoO4-2 + 1 Pb+2
PbOH[Sb[OH]6]_exp1	12.00	PbOH[Sb[OH]6]_exp1 + 1 H+ -> 1 H2O + 1 Pb+2 + 1 Sb[OH]6-
Sn[OH]2[s]	1.447	Sn[OH]2[s] + 2 H+ -> 2 H2O + 1 Sn+2
Strengite	48.00	Strengite + 2 H2O -> 1 Fe[OH]4- + 4 H+ + 1 PO4-3
Wairakite	113.6	Wairakite + 10 H2O -> 2 Al[OH]4- + 1 Ca+2 + 8 H+ + 4 H2SiO4-2
Willemite	6.289	Willemite + 2 H+ -> 1 H2SiO4-2 + 2 Zn+2


pH dependent concentration of Aluminum
pH dependent concentration of Arsenic
pH dependent concentration of Barium
pH dependent concentration of Calcium
pH dependent concentration of Cadmium
Al Profile at L/S=10 L/kg
As Profile at L/S=10 L/kg
Ba Profile at L/S=10 L/kg
Ca Profile at L/S=10 L/kg
Cd Profile at L/S=10 L/kg
Inorganic Carbon
Cl Profile at L/S=10 L/kg
Co Profile at L/S=10 L/kg
CO32- Profile at L/S=10 L/kg
Cr Profile at L/S=10 L/kg
Cu Profile at L/S=10 L/kg
Fe Profile at L/S=10 L/kg
B Profile at L/S=10 L/kg
Si Profile at L/S=10 L/kg
K Profile at L/S=10 L/kg
Li Profile at L/S=10 L/kg
pH dependent concentration of Magnesium
pH dependent concentration of Manganese
pH dependent concentration of Molybdenum
pH dependent concentration of Sodium
pH dependent concentration of Nickel
Concentration (mg/L)
pH
DTL
Total Dissolved
DHA-bound
SHA-bound
FeOxide
Clay
Anorthite
Cem07_Al[OH]3[am]
Exp_CaCO3_BaCO3
CaCO3_MnCO3-exp
PATCH_beta-TCP
Co2SiO4
Eskolaite
Cu[OH]2[s]
AA_Fe[OH]3[am]
Exp_FeVO4:2H2O_am
Strengite
Willemite


Mg Profile at L/S=10 L/kg
Mn Profile at L/S=10 L/kg
Mo Profile at L/S=10 L/kg
Na Profile at L/S=10 L/kg
Ni Profile at L/S=10 L/kg
Pb Profile at L/S=10 L/kg
P Profile at L/S=10 L/kg
Sb Profile at L/S=10 L/kg
Se Profile at L/S=10 L/kg
Sn Profile at L/S=10 L/kg
S Profile at L/S=10 L/kg
Sr Profile at L/S=10 L/kg
V Profile at L/S=10 L/kg
Zn Profile at L/S=10 L/kg
Concentration (mg/L)
pH
DTL
Fly ash vitrified Taiwan(P.1.1)
As modeled. L/S=10.02(P.1.1)
Total Dissolved
DHA-bound
SHA-bound
FeOxide
Clay
Cem07_Brucite
Manganite
CaCO3_MnCO3-exp
PbMoO4[c]
Ni(OH)2[s]
PbOH[Sb(OH)6]_exp1
Pb(OH)2[C]
PATCH_beta-TCP
Strengite
Sn(OH)2[s]
Exp_FeVO4:2H2O_am
Willemite

Model Comparison: residuals - Concentration

Name **Vitrified MSWI Fly ash TW**

Legend

Total Average Deviation Square root of the sum of the squared values of residuals divided by the number of values, over the entire X range.
User Average Deviation Square root of the sum of the squared values of residuals divided by the number of values, over the user defined X range.
Fractional Average Devi Square root of the sum of the squared values of residuals divided by the number of values, over the fraction.
Note that the Total and User Average Deviation columns are averages as well.

Residual details, concentrations

Residuals as log(model/sample)

Fraction	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	*Total Avg*
pH	*2.93*	*4.31*	*5.75*	*6.72*	*7.27*	*8.05*	*9.42*	*11.7*	*Deviation*
Al	-0.01	1.13	0.84	-0.31	-1.09	-0.33	0.21	0.33	0.23
As	-0.55	-0.82	1.05	1.48	0.30	0.58	0.65	1.39	0.33
Ba	0.00	0.48	0.82	0.97	1.15	0.87	-0.28	-1.17	0.29
Ca	0.00	0.27	0.34	0.37	0.41	0.28	0.11	0.14	0.10
Cd	0.01	-0.02	-0.07	-0.26	0.12	-0.23	-0.42	0.10	0.07
Cl	0.60	0.99	0.65	0.69	0.00	0.87	0.86	1.11	0.28
Co	0.00	0.21	1.12	1.52	1.92	0.42	-1.06	0.38	0.37
CO32-	-	-	-	-	-	-	-	-	-
Cr	-1.15	-0.37	1.98	0.68	0.25	0.44	-1.09	0.92	0.36
Cu	-0.03	0.07	0.60	0.59	0.99	1.07	-0.93	-0.03	0.24
F	-	-	-	-	-	-	-	-	-
Fe	-0.04	0.16	2.47	0.42	-0.12	0.83	-1.51	1.17	0.41
B	0.00	0.43	0.66	0.72	0.74	0.51	0.57	0.56	0.20
Si	0.00	0.92	1.30	1.29	1.27	1.30	0.87	0.60	0.37
Hg	-	-	-	-	-	-	-	-	-
K	0.54	1.04	0.70	0.73	0.00	0.88	0.90	1.16	0.29
Li	0.00	0.35	0.91	0.52	0.41	1.13	1.25	0.43	0.26
Mg	0.00	0.15	0.31	0.36	0.47	0.11	-0.18	0.04	0.09
Mn	0.00	0.41	0.73	0.85	1.08	0.64	0.12	-1.48	0.29
Mo	-0.34	-1.42	-0.55	0.10	1.55	0.35	0.43	0.94	0.31
Na	0.00	0.41	0.52	0.58	0.60	-0.51	-0.47	-0.99	0.20
Ni	0.00	0.37	1.26	1.58	2.19	1.05	0.65	0.34	0.41
Pb	-0.05	-0.07	1.55	0.83	0.45	1.28	-0.71	-0.48	0.30
P	-1.17	-1.42	2.16	1.35	1.21	1.83	0.93	1.01	0.51
Sb	0.00	-0.34	-0.12	-0.50	0.11	-1.05	-0.59	1.35	0.24
Se	0.52	-0.36	1.03	1.58	0.29	0.53	1.72	0.00	0.34
Sn	-0.07	0.17	-0.24	0.32	0.04	0.05	-0.27	0.10	0.07
S	0.15	0.16	0.16	0.15	0.06	0.05	0.00	0.08	0.04
Sr	0.00	0.38	0.53	0.56	0.63	0.36	0.20	-0.02	0.14
U	-	-	-	-	-	-	-	-	-
V	-1.03	-0.65	1.32	-0.21	-1.01	-1.65	-0.06	-0.12	0.33
Zn	0.04	-0.01	0.01	0.10	0.91	-0.03	-1.36	-0.13	0.21
Avg Deviati	0.08	0.12	0.20	0.16	0.17	0.16	0.15	0.15	0.26

Yellow = own pH All residuals within + 1 or - 1 are considered to represent a good fit.