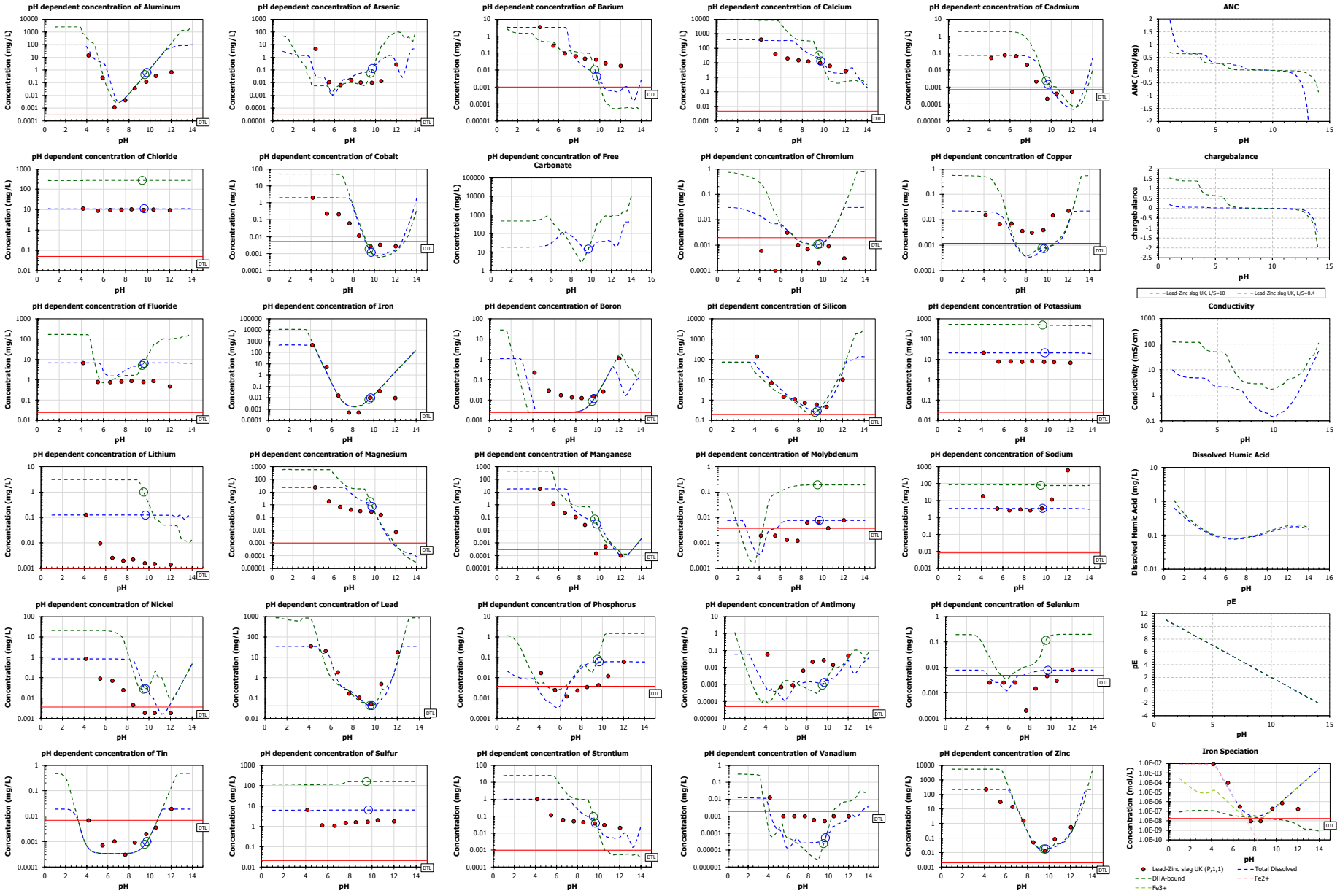
LEAD-ZINC SLAG UK

COMPARISON pH DEPENDENCE WITH MODEL



Object pH Dependent Leaching Test Model
Name Lead-Zinc slag UK

pH Dependent Leaching Test Scenario

Lab Test

Extra L/S Simulation

Lab Test

Model Parameters

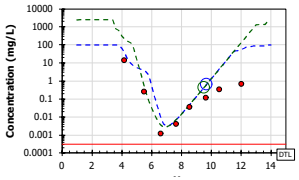
Entity	Unit	Default	Available Content Entity	mg/kg	Entity	mg/kg	Entity	mg/kg
c0		-6.197	Al	981.1	B	11.16	Sb	0.5960
c1		-0.3078	As	46.00	Si	1358	Se	0.07900
c2		0.003221	Ba	33.36	K	209.2	Sn	0.1910
c3		0.003526	Ca	3879	Li	1.246	SO4	189.7
c4		-0.0001801	Cd	0.7480	Mg	232.2	Sr	9.993
c5		0	Cl	110.1	Mn	176.0	V	0.1230
Clay	mg/kg	3000	Co	20.19	Mo	0.07700	Zn	2155
Hydrous Ferric Oxide	mg/kg	300.0	CO32-	5800	Na	34.00		
L/S	L/kg	10.00	Cr	0.3100	Ni	8.364		
pE		0.2000	Cu	0.2250	NO3	6.200E-09		
pH		11.80	F	66.00	Pb	345.2		
Solid Humic Acid	mg/kg	15.00	Fe	4597	PO4	1.828		
Simulated Low L/S	L/kg	0.4000						

Minerals

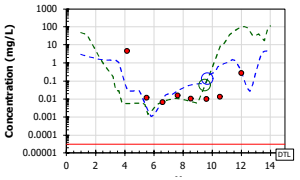
Name	Log(K)	Reaction
AA_Fe[OH]3[am]	16.60	AA_Fe[OH]3[am] + 1 H2O -> 1 Fe[OH]4- + 1 H+
Adamite-therm	12.64	Adamite-therm + 1 H+ -> 1 AsO4-3 + 1 H2O + 2 Zn+2
Arsenocrandallite-therm	95.56	Arsenocrandallite-therm + 6 H2O -> 3 Al[OH]4- + 2 AsO4-3 + 1 Ca+2 + 7 H+
Austinite-therm	11.47	Austinite-therm + 1 H+ -> 1 AsO4-3 + 1 Ca+2 + 1 H2O + 1 Zn+2
Boehmite	14.42	Boehmite + 2 H2O -> 1 Al[OH]4- + 1 H+
Ca2[OH][AsO4][c]	4.000	Ca2[OH][AsO4][c] + 1 H+ -> 1 AsO4-3 + 2 Ca+2 + 1 H2O
Ca2[OH]2.2Sb[OH]6[c]_e	5.000	Ca2[OH]2.2Sb[OH]6[c]_exp1 + 2 H+ -> 2 Ca+2 + 2 H2O + 2 Sb[OH]6-
Ca2Cd[PO4]2	32.95	Ca2Cd[PO4]2 -> 2 Ca+2 + 1 Cd+2 + 2 PO4-3
CaCO3_BaCO3	21.00	CaCO3_BaCO3 -> 1 Ba+2 + 2 CO3-2 + 1 Ca+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-exp2	19.78	CaCO3_MnCO3-exp2 -> 2 CO3-2 + 1 Ca+2 + 1 Mn+2
CaCO3_SrCO3	19.85	CaCO3_SrCO3 -> 2 CO3-2 + 1 Ca+2 + 1 Sr+2
CaHBO3	-2.097	CaHBO3 + 1 H+ -> 1 Ca+2 + 1 H2BO3-
Cd2SiO4	6.059	Cd2SiO4 + 2 H+ -> 2 Cd+2 + 1 H2SiO4-2
Cem07_Brucite	-16.83	Cem07_Brucite + 2 H+ -> 2 H2O + 1 Mg+2
Cem07_C2ASH8	17.40	Cem07_C2ASH8 -> 2 Al[OH]4- + 2 Ca+2 + 3 H2O + 1 H2SiO4-2
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_M4AcH9	-4.823	Cem07_M4AcH9 + 4 H+ -> 2 Al[OH]4- + 1 CO3-2 + 7 H2O + 4 Mg+2
Cem07_SiO2[am]	24.21	Cem07_SiO2[am] + 2 H2O -> 2 H+ + 1 H2SiO4-2
Cerussite	13.20	Cerussite -> 1 CO3-2 + 1 Pb+2
Co2SiO4	5.289	Co2SiO4 + 2 H+ -> 2 Co+2 + 1 H2SiO4-2

Name	Log(K)	Reaction
Cr[OH]3[A]	68.13	Cr[OH]3[A] + 1 H2O -> 1 CrO4-2 + 5 H+ + 3 e-
Fe2[MoO4]3[	86.35	Fe2[MoO4]3[2] + 8 H2O -> 2 Fe[OH]4- + 8 H+ + 3 MoO4-2
FeBO3_EXP	32.48	FeBO3_EXP + 2 H2O -> 1 Fe[OH]4- + 2 H+ + 1 H2BO3-
FeSbO4[s]_ex	32.48	FeSbO4[s]_exp1 + 6 H2O -> 1 Fe[OH]4- + 2 H+ + 1 Sb[OH]6-
Fluorite	10.96	Fluorite -> 1 Ca+2 + 2 F-
Hydrocerussit	18.77	Hydrocerussite + 2 H+ -> 2 CO3-2 + 2 H2O + 3 Pb+2
Li2_CaO_Al2(	22.69	Li2_CaO_Al2O3_SiO2_8H2O[s] -> 2 Al[OH]4- + 1 Ca+2 + 3 H2O + 1 H2SiO4-2 + 2 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
Ni2SiO4	5.498	Ni2SiO4 + 2 H+ -> 1 H2SiO4-2 + 2 Ni+2
PATCH_BaCa	7.412	PATCH_BaCaSO4[50%Ba] -> 0.5 Ba+2 + 0.5 Ca+2 + 1 SO4-2
PATCH_beta-	28.93	PATCH_beta-TCP -> 3 Ca+2 + 2 PO4-3
PATCH_Pb5[A	62.13	PATCH_Pb5[AsO4]3OH + 1 H+ -> 3 AsO4-3 + 1 H2O + 5 Pb+2
PATCH_PbHA	23.97	PATCH_PbHAsO4 -> 1 AsO4-3 + 1 H+ + 1 Pb+2
Pb2SiO4	6.289	Pb2SiO4 + 2 H+ -> 1 H2SiO4-2 + 2 Pb+2
Pb2V2O7	0.9500	Pb2V2O7 + 3 H+ -> 1.5 H2O + 1 Pb+2 + 1 VO2+
PbOH[Sb[OH]	11.00	PbOH[Sb[OH]6]_exp3 + 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
Tenorite	-7.644	Tenorite + 2 H+ -> 1 Cu+2 + 1 H2O
THERMODDE	120.8	THERMODDEM_Laumontite + 8 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

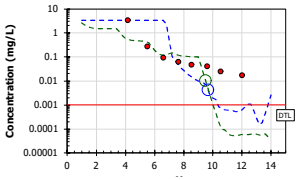
pH dependent concentration of Aluminum



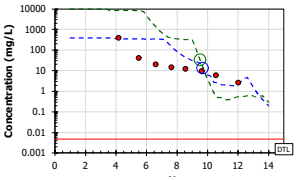
pH dependent concentration of Arsenic



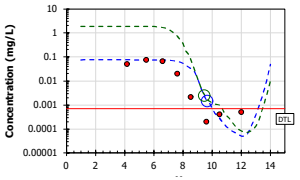
pH dependent concentration of Barium



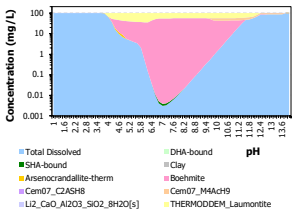
pH dependent concentration of Calcium



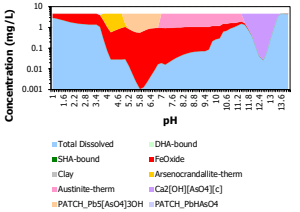
pH dependent concentration of Cadmium



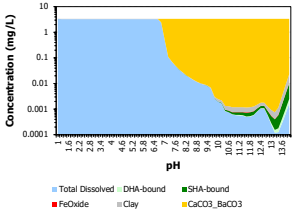
Al Profile at L/S=10 L/kg



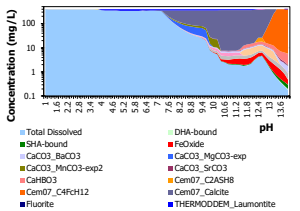
As Profile at L/S=10 L/kg



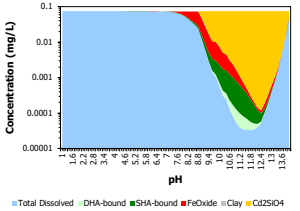
Ba Profile at L/S=10 L/kg



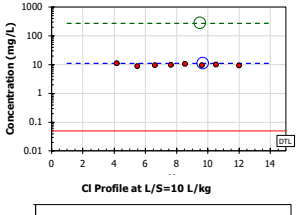
Ca Profile at L/S=10 L/kg



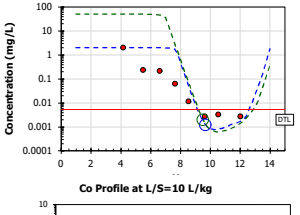
Cd Profile at L/S=10 L/kg



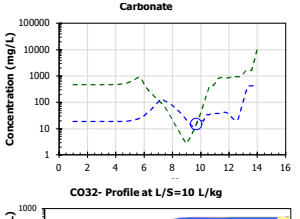
Cl Profile at L/S=10 L/kg



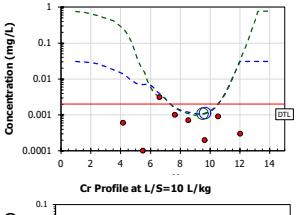
Co Profile at L/S=10 L/kg



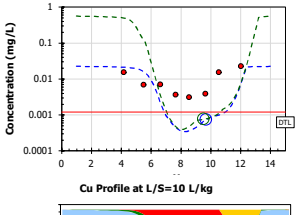
CO32- Profile at L/S=10 L/kg



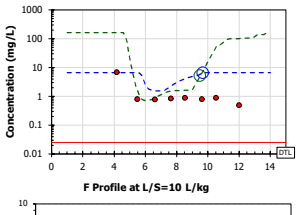
Cr Profile at L/S=10 L/kg



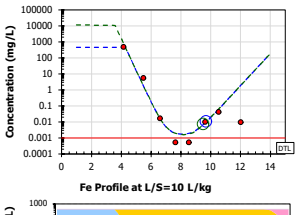
Cu Profile at L/S=10 L/kg



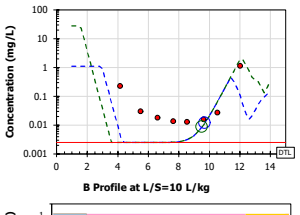
F Profile at L/S=10 L/kg



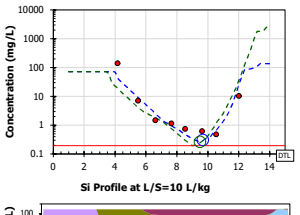
Fe Profile at L/S=10 L/kg



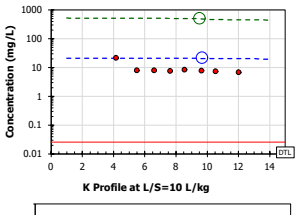
B Profile at L/S=10 L/kg



Si Profile at L/S=10 L/kg



K Profile at L/S=10 L/kg



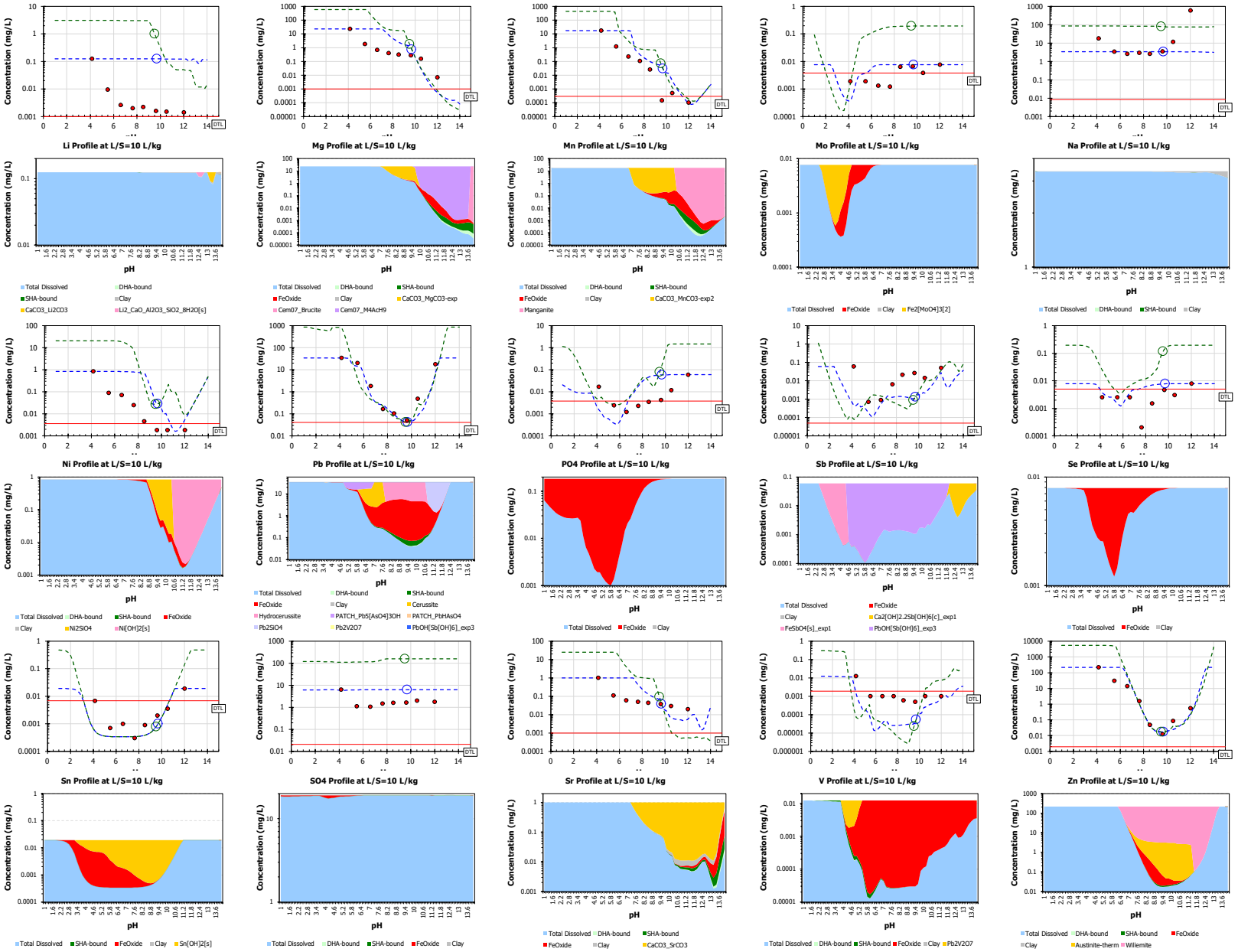
pH dependent concentration of Lithium

pH dependent concentration of Magnesium

pH dependent concentration of Manganese

pH dependent concentration of Molybdenum

pH dependent concentration of Sodium


Li Profile at L/S=10 L/kg
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
PO4 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
SO4 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
Total Dissolved
DHA-bound
SHA-bound
Clay
FeOxide
CaCO3_Li2CO3
Li2_CaO_Al2O3_SiO2_8H2O[s]
Cem07_Brucite
Cem07_M4AcH9
CaCO3_MgCO3-exp
CaCO3_MnCO3-exp2
Manganite
Fe2[MoO4]3[2]
Ni2SiO4
Ni[OH]2[s]
Hydrocerussite
PATCH_Pb5[AsO4]3OH
PATCH_PbHAsO4
Pb2SiO4
Pb2V2O7
PbOH[Sb[OH]6]_exp3
Cerussite
Ca2[OH]2.2Sb[OH]6[c]_exp1
FeSbO4[s]_exp1
PbOH[Sb[OH]6]_exp3
Sn[OH]2[s]
CaCO3_SrCO3
Austinite-therm
Willemite

Model Comparison: residuals - Concentration

Name **Lead-Zinc slag UK**

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	*4.17*	*5.50*	*6.61*	*7.64*	*8.55*	*9.63*	*10.5*	*12.0*	*Deviation*
Al	0.45	1.17	0.90	0.22	0.13	0.68	1.14	1.93	0.35
As	-2.15	-0.50	0.12	0.25	0.76	0.99	1.72	0.07	0.38
Ba	0.00	1.09	1.55	-0.12	-0.51	-0.87	-1.49	-1.44	0.37
Ca	-0.04	0.93	1.24	1.01	0.57	0.26	-0.36	-0.06	0.25
Cd	0.17	0.00	0.05	0.51	1.19	0.88	-0.18	-1.00	0.23
Cl	0.00	0.10	0.07	0.05	0.03	0.07	0.04	0.07	0.02
Co	0.00	0.93	0.97	1.43	0.64	-0.30	-0.61	-0.20	0.27
CO32-	-	-	-	-	-	-	-	-	-
Cr	1.36	1.84	0.10	0.21	0.23	0.74	0.34	2.01	0.40
Cu	0.14	0.36	-0.50	-0.90	-0.93	-0.73	-1.19	-0.49	0.26
F	0.00	0.93	0.31	0.45	0.67	0.90	0.89	1.15	0.27
Fe	-0.01	-0.47	-0.01	0.60	0.59	-0.05	0.21	2.31	0.31
B	-1.72	-1.07	-0.84	-0.71	-0.59	-0.17	0.40	-1.02	0.33
Si	-0.49	0.12	0.25	-0.06	-0.18	-0.34	0.17	0.42	0.10
K	0.00	0.44	0.43	0.45	0.41	0.44	0.46	0.49	0.15
Li	0.00	1.12	1.68	1.79	1.75	1.89	1.91	1.94	0.58
Mg	0.00	1.10	1.54	1.31	0.91	0.54	-0.75	-1.12	0.36
Mn	0.00	1.17	1.89	0.47	0.59	2.42	0.89	-0.02	0.44
Mo	-0.70	0.30	0.76	0.81	0.09	0.07	0.31	0.00	0.17
Na	-0.72	0.00	0.11	0.07	0.12	-0.01	-0.54	-2.25	0.30
Ni	0.00	0.97	1.07	1.51	2.18	1.19	0.57	0.48	0.42
Pb	-0.01	-0.15	-0.43	0.18	-0.04	-0.09	-0.76	-0.40	0.12
PO4	-	-	-	-	-	-	-	-	-
Sb	-2.11	-0.59	-0.24	-0.70	-1.18	-1.36	-0.81	-0.28	0.38
Se	0.18	-0.22	0.17	1.44	0.67	0.23	0.42	0.00	0.21
Sn	-1.10	-0.31	-0.47	0.06	-0.37	-0.33	0.16	0.00	0.17
SO4	-	-	-	-	-	-	-	-	-
Sr	0.00	0.95	1.23	0.94	0.49	0.14	-0.61	-0.54	0.26
V	-0.90	-1.24	-1.46	-1.59	-1.33	-1.09	-0.58	-0.08	0.40
Zn	0.00	0.85	0.60	-0.19	-0.03	0.16	-0.53	-0.33	0.16
Avg Deviati	0.15	0.16	0.17	0.16	0.16	0.16	0.16	0.20	0.28

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