

# Physicochemical Properties of Fe-Bearing Phases from Commercial Colombian Coal Ash

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Table S1 – Trace elements results for magnetic concentrates and respective size-fractions. World coal ash (WCA; Ketris and Yudovich, 2009) added for comparison.

		PPB										PPM											
		C <sub>tot</sub>	Ag	Al	Ca	Fe	K	Mg	Na	P	S	Ti	As	Ba	Be	Bi	Cd	Co	Cr	Cu	Hf	In	
WCA		n.a.	0.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	51	1040	13	7.9	1.5	39	125	115	9.3	0.39		
SI-BA	Bulk	0.35	0.1	7.42	0.79	5.14	1.6	0.96	0.76	0.054	<0.04	0.478	2.1	764	4	0.13	0.27	17.7	91	56.6	3.87	0.03	
	Fe	MC	0.07	0.1	8.52	1.26	9.05	1.49	1.45	0.634	0.059	<0.1	0.414	3	750	3	0.1	0.3	19.9	97	53.2	3.4	<0.05
		>500	0.04	0.1	8.65	0.98	5.43	1.87	1.16	0.71	0.067	<0.1	0.497	3	986	4	<0.1	0.5	20.2	86	54.7	4.1	<0.05
		500-150	0.08	0.1	9.11	1.25	6.32	1.78	1.28	0.692	0.074	<0.1	0.492	4	916	4	0.1	0.5	20.4	87	59.6	4	0.06
		150-75	0.08	0.1	8.49	1.2	8.21	1.68	1.46	0.644	0.074	<0.1	0.474	5	822	4	<0.1	0.6	20.5	91	56.3	3.6	<0.05
		75-45	0.1	0.1	8.55	1.17	10.2	1.52	1.58	0.634	0.065	<0.1	0.441	5	807	3	<0.1	0.6	22.9	100	56.9	3.5	<0.05
		<45	0.24	0.2	9.13	1.13	13.5	1.56	1.74	0.632	0.072	<0.1	0.463	7	844	4	0.1	0.7	30.6	169	66.8	3.7	0.06
		TL	0.24	0.1	8.43	0.82	4.45	1.62	0.96	0.719	0.053	<0.1	0.449	1	767	3	<0.1	0.2	16.7	77	47.4	3.9	<0.05
	Nd	MC	0.21	0.1	8.98	0.9	4.58	1.88	1.06	0.759	0.066	<0.1	0.497	3	914	3	0.1	0.5	19.3	85	63.3	4	0.05
		>2000	0.05	0.1	9.07	0.93	4.94	1.93	1.09	0.686	0.06	<0.1	0.508	3	965	4	<0.1	0.4	21.1	104	67.6	4.3	0.05
		2000-500	0.05	0.2	9.36	0.96	4.96	1.9	1.12	0.681	0.069	<0.1	0.509	2	988	3	0.1	0.8	22.4	93	61.7	4.3	0.06
		500-150	0.28	0.1	8.78	1.05	4.87	1.77	1.11	0.737	0.069	<0.1	0.492	4	911	4	<0.1	0.6	24.5	85	54.7	3.9	0.06
		150-75	0.23	0.1	7.9	0.87	3.9	1.74	0.95	0.698	0.063	<0.1	0.459	4	831	3	<0.1	0.4	18.1	71	50.1	3.7	<0.05
		75-45	0.27	0.1	8.9	0.74	3.63	1.93	0.91	0.79	0.068	<0.1	0.481	4	894	3	0.3	0.6	18.6	71	51.3	3.8	0.05
		<45	0.51	0.1	9.18	0.6	3.8	2.02	0.94	0.844	0.063	<0.1	0.534	4	958	4	0.2	0.9	22.6	90	57.8	4.3	0.05
	TL	0.22	<0.1	8.22	0.84	4.98	1.64	1.02	0.751	0.062	0.1	0.479	12	803	4	<0.1	<0.1	17.4	108	44.8	4	<0.05	
SI-ECO	Bulk	1.69	0.1	6.67	1.12	5.42	1.33	1.01	0.839	0.054	0.05	0.376	6.5	696	3	0.16	0.7	15.2	76	48.1	3.05	0.04	
	Fe	MC	0.41	<0.1	6.43	2.09	23.8	0.96	2.48	0.443	0.066	<0.1	0.312	10	634	3	0.1	0.5	23	120	53	2.6	<0.05
		>150	2.52	0.2	8.84	1.45	7.04	1.73	1.43	0.777	0.085	<0.1	0.475	14	902	4	0.2	1.4	20.4	117	58.2	3.7	0.08
		150-75	1.15	0.1	7.28	2.25	17.6	1.15	2.26	0.583	0.08	<0.1	0.362	9	782	4	<0.1	0.9	20.2	103	49.5	3.1	<0.05
		75-45	0.27	0.1	6.75	1.99	22.3	0.95	2.45	0.408	0.066	<0.1	0.35	8	700	3	<0.1	0.6	25.8	105	54.1	2.9	<0.05
		<45	0.23	0.2	7.78	1.9	23.4	1.06	2.54	0.398	0.091	<0.1	0.395	16	814	4	0.2	1.2	34.5	174	74.6	3.5	0.07
		TL	1.76	0.1	7.12	0.92	2.67	1.42	0.82	0.781	0.052	<0.1	0.403	5	688	3	0.1	0.7	13.2	66	40	3	<0.05
	Nd	MC	0.53	0.2	8.44	1.17	3.86	1.7	1.1	0.744	0.063	<0.1	0.465	8	961	3	0.2	1.3	20	74	54.8	4.1	<0.05
		>150	0.68	0.2	9.2	1.05	4.62	1.8	1.15	0.767	0.069	<0.1	0.52	9	961	4	0.3	1.4	22.6	101	63.6	4.3	0.06
		150-75	0.46	0.1	6.52	1.28	3.22	1.3	0.96	0.824	0.06	<0.1	0.337	6	709	3	<0.1	0.7	13.7	55	39.5	2.7	0.05
		75-45	0.25	0.1	8.83	1.28	3.58	1.65	1.06	0.885	0.069	<0.1	0.445	6	844	3	0.2	0.7	16	59	48.4	3.5	<0.05
		<45	0.35	0.3	9.81	1.09	4.18	1.92	1.21	0.951	0.075	<0.1	0.57	10	1101	4	0.3	1.5	22.8	94	65	5	0.07
TL		3.49	<0.1	6.68	0.84	1.45	1.22	0.59	0.94	0.049	<0.1	0.314	3	614	2	0.2	0.6	9.6	44	31.5	2.8	<0.05	

BA - bottom ash; ECO, economizer grits; ESP, electrostatic precipitator; MC, magnetic concentrate; TL, tailings;

Table S1 – Continuation.

PPM																					
Li	Mn	Mo	Nb	Ni	Pb	Re	Rb	Sb	Se	Sn	Sr	Ta	Te	Th	Tl	U	V	W	Zn	Zr	Sc
87	460	15	23	105	61	n.a.	120	8.1	10.7	8.4	780	2.1	n.a.	24	5	16	180	8.4	180	240	25
80.7	593	4.6	12.03	60.7	11.17	<0.002	36	2.67	0.6	1.1	200	0.8	<0.05	5.6	0.48	3.9	217	1	89.8	142.6	14.2
70.3	1082	4.3	10.6	66.6	10.8	<0.005	73	3.2	<1	1.4	225	0.7	<0.5	9.3	<0.5	4.1	231	1.3	95	125.9	21
75.1	589	3.7	13.3	62.9	15.3	<0.005	101.1	4.1	<1	1.5	271	1	<0.5	12.1	0.6	4.9	231	4.2	114	148.1	19
72.7	749	4	12.5	65.2	14	<0.005	100.1	3.8	<1	1.4	272	0.9	<0.5	12.5	<0.5	4.9	225	4.2	109	144.2	20
68.1	1046	4.1	11.2	63.6	12.4	<0.005	80.1	3.5	<1	1.4	243	0.8	<0.5	10.4	<0.5	4.2	238	3	100	131.3	21
72	1173	4.6	10.9	68.2	12.5	<0.005	70.5	3.4	<1	1.5	231	0.8	<0.5	10.3	0.5	4.5	250	2.4	99	130	22
70.4	1319	6.7	11.4	96.2	14.5	<0.005	81.4	4.9	<1	2.2	241	0.7	<0.5	11	0.6	5.3	297	4.3	143	130.2	25
75.2	470	2.3	11.7	55	9.7	<0.005	84.4	2.4	<1	0.9	214	0.8	<0.5	9.5	<0.5	3.9	202	1	74	146	17
73.5	491	3.1	12.9	61.5	14.5	<0.005	97.6	3.6	<1	1.4	262	0.9	<0.5	11.8	0.6	4.6	224	2.5	110	148.3	19
75.2	535	2.9	13.3	77.8	14.7	<0.005	102.4	3.6	<1	1.3	274	0.9	<0.5	11.8	0.5	4.9	225	1.9	112	154	20
76.2	534	3.7	14	70.4	16.7	<0.005	104.6	4.5	<1	2.1	285	1	<0.5	12	0.7	5	236	2.4	132	160.8	20
80	540	3.4	12.9	66.1	13.3	<0.005	95.5	3.5	<1	1.3	262	0.9	<0.5	10.7	0.5	1.1	222	2.7	104	143.1	19
70.2	427	2.9	11.6	54.8	12.1	<0.005	89.2	3	<1	1.2	230	0.8	<0.5	10.6	0.5	4	199	3	88	131.2	17
79	383	3.1	12.9	56.4	14	<0.005	95.4	3.4	<1	1.2	238	0.9	<0.5	11.2	0.6	3.9	203	3.1	92	149.6	18
87	367	3	13.9	67.5	16.8	<0.005	105	3.9	<1	1.5	248	1	<0.5	12	0.7	4	219	4.6	116	165.7	20
72.5	512	3	11.5	63.2	8.2	<0.005	85.9	2.2	<1	0.8	216	0.8	<0.5	10.3	<0.5	4	197	1.8	67	151.9	18
64.2	626	5.4	8.79	50.1	11.52	0.008	31.9	3.42	0.9	1.3	194	0.6	0.07	5.5	0.56	3.3	184	1	82.9	108	12.6
43.8	2592	8.5	7.9	79.4	7.9	<0.005	51.3	4.5	<1	1.3	209	0.5	<0.5	7.9	<0.5	4.2	242	1.5	85	98.8	26
74.5	939	6.9	11.5	67	15.3	<0.005	82.9	6.3	<1	1.8	261	0.8	<0.5	10.8	0.6	4.8	252	1.7	120	132.4	22
56.1	2385	7.6	8.8	66	9.7	<0.005	66.8	4.1	<1	1.2	231	0.6	<0.5	10.2	<0.5	4.2	222	1.5	85	104	25
41.7	2546	7.6	8.3	79.5	9.1	<0.005	59.4	4.6	<1	1.4	220	0.6	<0.5	9.8	<0.5	4.6	244	1.4	88	104.5	27
49.1	2187	11	10.5	112.2	13.3	<0.005	72.6	7.8	<1	2.5	267	0.7	<0.5	11.8	0.6	7	346	2.7	146	122.9	29
62.1	304	3.3	9.3	44.3	10.3	<0.005	73.4	3	<1	1	196	0.6	<0.5	8	0.6	3.2	156	0.9	73	114.8	14
69.8	451	4.5	12.6	62	16	<0.005	101.9	5.1	<1	1.6	276	0.9	<0.5	12.6	0.7	5	204	1.7	116	147.2	17
76	508	5.3	13.2	70.2	18.5	<0.005	96.7	6.1	<1	2	282	0.9	<0.5	11.7	0.8	5.5	250	1.8	132	151.8	20
55.8	404	3.2	8.1	40.9	9.9	<0.005	69.9	2.9	<1	0.9	197	0.6	<0.5	8.9	<0.5	3.3	146	1.2	74	97.5	14
76.5	438	3.5	11.1	52.7	11.9	<0.005	80.8	3.7	<1	1.1	240	0.8	<0.5	11.3	0.5	4.2	196	1.1	80	137.5	18
98.5	478	5.3	14.2	70.8	19.4	<0.005	104.6	6	<1	1.8	322	1	<0.5	14.4	0.8	5.8	260	1.8	116	176.1	23
61.2	167	2	7.7	29.2	7.9	0.007	62.3	2	<1	0.6	176	0.5	<0.5	7.2	<0.5	2.6	114	0.7	52	94.4	11

Table S1 -Continuation.

		PPB											PPM										
		C <sub>tot</sub>	Ag	Al	Ca	Fe	K	Mg	Na	P	S	Ti	As	Ba	Be	Bi	Cd	Co	Cr	Cu	Hf	In	
S1-ESP12	Bulk	5.51	0.3	7.5	0.65	4.37	1.81	0.9	0.794	0.066	0.11	0.507	18	813	4	0.39	1.91	20.3	107	68.9	3.8	0.08	
	Fe	MC	1.72	0.1	6.5	1.68	26.8	0.88	2.3	0.329	0.085	<0.1	0.293	24	565	4	0.2	1	40.2	242	59.1	2.4	0.07
		> 75	9.95	0.1	7.49	1.88	14.3	1.32	1.76	0.566	0.068	0.2	0.344	13	682	4	0.2	0.9	17.4	100	46.2	2.8	0.07
		75-45	3.58	0.1	7.72	1.99	25.4	1.09	2.43	0.498	0.07	<0.1	0.351	14	652	3	0.2	0.8	32.6	126	53.7	2.6	0.09
		45-25	1.32	0.1	6.93	1.72	26.3	0.88	2.3	0.408	0.076	<0.1	0.332	21	645	3	0.2	1.2	40	186	59.7	2.8	0.11
		<25	0.66	0.3	8.37	1.69	27.7	1.18	2.57	0.443	0.132	<0.1	0.4	53	827	6	0.6	2.5	47.9	374	83.1	3	0.15
		TL	5.69	0.3	8.61	0.58	3.15	1.96	0.92	0.784	0.065	<0.1	0.521	17	944	4	0.4	1.9	20.9	114	69	4.3	0.07
	Nd	MC	7.54	0.2	9.18	0.95	5.25	1.76	1.31	0.646	0.084	<0.1	0.497	24	899	4	0.4	2.1	24.7	155	67.5	3.7	0.08
		>75	16.79	0.2	7.82	0.87	4.5	1.64	1.04	0.717	0.068	<0.1	0.438	18	840	4	0.7	2.3	17.3	115	62.1	3.4	0.09
		75-45	10.32	0.2	9.16	0.97	4.45	1.84	1.1	0.813	0.07	<0.1	0.474	20	957	4	0.3	2.1	20.5	122	66.3	3.6	<0.05
		45-25	5.9	0.2	9.53	1.1	4.84	1.77	1.23	0.693	0.077	<0.1	0.494	24	881	4	0.3	1.8	23	144	66	3.8	<0.05
		<25	1.81	0.3	10.7	0.95	6.63	2.08	1.59	0.749	0.099	<0.1	0.596	32	1061	5	0.5	2.7	30.6	185	78.9	4.4	0.12
		TL	6.13	0.3	9.12	0.6	2.64	2.04	0.89	0.682	0.068	<0.1	0.529	18	1025	4	0.6	2.4	21.3	97	68.2	4.5	0.08
S4-BA	Bulk	0.22	0.1	7.43	0.83	5.99	1.44	0.87	0.692	0.043	<0.04	0.476	3.8	894	4	0.09	0.33	20.3	88	73.5	4.5	0.04	
	Fe	MC	0.05	0.1	8.31	1.33	10.4	1.37	1.3	0.595	0.048	<0.1	0.408	5	811	4	0.1	0.4	24	98	49.3	3.4	<0.05
		TL	0.13	0.1	8.44	0.93	5.5	1.52	0.92	0.683	0.042	<0.1	0.466	4	907	4	<0.1	0.2	20.3	73	45.2	4.3	<0.05
S4-ECO	Bulk	5.32	0.1	8.77	1.31	6.32	1.42	0.97	0.684	0.049	0.07	0.422	11	854	4	0.11	0.76	18.3	85	47.2	3.75	0.04	
	Fe	MC	2.73	0.1	7.35	1.73	24.3	1.06	1.72	0.437	0.055	<0.1	0.342	15	698	4	0.1	0.6	36.7	111	51	3	<0.05
		TL	5.97	0.1	7.89	0.97	2.94	1.46	0.8	0.663	0.043	<0.1	0.418	10	818	4	0.1	0.6	15.4	71	40.4	3.7	<0.05
S4-ESP	Bulk	6.32	0.3	10.9	1.22	5.53	1.73	1.08	0.862	0.06	0.15	0.511	28	1151	5	0.4	2.25	24.9	108	70.1	4.24	0.09	
	Fe	MC	1.78	0.1	6.52	1.56	29.8	0.8	1.82	0.333	0.067	<0.1	0.289	27	652	5	0.2	1	49	212	59.3	2.4	0.06
		TL	7.1	0.3	9.11	0.82	3.28	1.83	0.95	0.799	0.055	<0.1	0.503	24	1156	5	0.4	1.9	23.3	103	66.3	4.3	0.07

BA - bottom ash; ECO, economizer grits; ESP, electrostatic precipitator; MC, magnetic concentrate; TL, tailings;

Table S1 – Continuation.

Li	Mn	Mo	Nb	Ni	Pb	Re	Rb	Sb	Se	Sn	Sr	Ta	Te	Th	Tl	U	V	W	Zn	Zr	Sc
89.6	451	13	12.26	70	25.25	0.03	36.3	7.64	5	3	203	0.8	0.17	4.7	1.73	4.6	275	2.1	169.2	137.9	14.3
41.5	2315	15	7.9	111	13.2	<0.005	37.9	9.1	6	3.3	201	0.5	<0.5	7.5	0.7	7	419	4.1	164	89.4	25
64.4	1898	15	8.5	56.9	11.5	0.035	48.8	4.6	13	1.5	222	0.6	<0.5	7.9	0.7	3.9	225	2.2	88	99.1	22
58.7	2534	11	8.4	94.6	11.1	0.014	57.5	5.1	7	1.7	222	0.6	<0.5	10	0.5	5.4	290	2	98	102.9	26
54.2	2202	13	9	109.7	13.3	0.009	36.9	8	7	2.6	228	0.6	<0.5	8.9	0.6	7.2	376	3.4	149	95.8	26
60.1	2236	26	10.7	138	25.1	0.015	64.7	18.7	10	6.5	278	0.7	<0.5	12.2	1.3	13.3	664	8.5	301	112.3	33
88.6	338	5.8	13.9	73	27	0.015	95.1	7.5	7	3.7	239	0.9	<0.5	9.9	1.9	5.2	249	1.7	171	158.7	19
77.1	601	6.8	12.4	76.2	25.4	0.021	93.7	9.8	9	4.1	267	0.9	<0.5	12.3	1.7	6.4	314	2.3	184	139.5	22
75.5	524	7.5	11	61.2	22.2	0.031	84.6	8	8	2.8	242	0.7	<0.5	10.2	1.4	5.8	237	1.9	154	120.1	20
81.8	520	6.6	12	64.5	22.2	0.034	92.1	7.6	7	3	262	0.8	<0.5	11.9	1.4	6	260	2.2	146	132.9	20
80.4	579	6.8	12.1	71.4	22	0.026	86.3	8.8	11	3.3	278	0.8	<0.5	11.9	1.4	6.4	311	2.4	156	138	22
93	738	7.5	15.4	93.5	32.5	0.012	97.2	13	10	5.2	308	1	<0.5	12.7	1.9	8.3	404	2.7	237	158.5	26
82.1	295	4.3	14.3	68.7	29.1	0.022	112.9	8	8	3.5	261	1	<0.5	11.7	2	5.4	237	1.5	180	161	19
84.1	566	4.7	12.91	69.9	11.43	<0.002	35.2	3.47	<0.3	1.1	249	0.9	0.06	6.1	0.59	4.1	214	1	99.5	169.8	16.3
73.9	1111	5.8	11.1	77.2	10.6	<0.005	66.9	3.6	<1	1.2	267	0.7	<0.5	9.6	0.5	4.3	223	1.3	91	130.5	21
81.4	497	3	12.7	62.8	10.5	<0.005	78.4	3.2	<1	1	276	0.9	<0.5	10.3	0.5	4.2	210	1	84	167.8	20
83.6	626	11	11.29	61.1	11.43	0.015	43.2	3.89	1.1	1.2	262	0.8	0.07	7.5	0.81	3.9	201	1.3	74.3	138.4	17.2
56.6	2052	11	9.4	108	9	<0.005	60.1	4.6	<1	1.3	260	0.6	<0.5	8.6	0.6	4.7	251	1.9	90	114.4	24
79	297	4.6	11.3	50.3	10.6	0.01	78.7	3.3	<1	0.9	259	0.8	<0.5	9.6	0.8	3.8	174	1.1	71	138	18
96.5	538	21	13.18	84.4	26.23	0.048	53.7	10.1	18.9	3	323	0.9	0.15	7.8	2.02	5.7	283	2.6	159.4	158.5	20.9
45.3	2122	16	8.5	134.6	11.8	<0.005	43.4	8.7	9	2.7	224	0.5	<0.5	7.6	0.8	7.3	408	3.2	154	97.4	25
91.3	340	8.2	14.1	78.7	26.1	0.022	97.7	9.1	13	2.6	329	0.9	<0.5	11.2	2.1	5.7	253	1.8	170	164.4	23

Table S2- Pearson's correlation coefficients for bulk Fe-MC.

	Al	Ca	Fe	K	Mg	Na	P	Ti	As	Ba	Be	Bi	Cd	Co	Cr	Cu	Hf	Li	Mn	Mo	Nb	Ni	Pb	Rb	Sb	Sn	Sr	Ta	Th	U	V	W	Zn	Zr	Sc	
C <sub>tot</sub>	1.00																																			
Al	-0.50	1.00																																		
Ca	0.32	-0.80	1.00																																	
Fe	0.75	<b>-0.94</b>	0.67	1.00																																
K	-0.65	<b>0.97</b>	-0.68	<b>-0.99</b>	1.00																															
Mg	0.23	<b>-0.88</b>	<b>0.88</b>	0.70	-0.74	1.00																														
Na	-0.72	<b>0.93</b>	-0.58	<b>-0.98</b>	<b>0.98</b>	-0.69	1.00																													
P	0.30	-0.72	0.39	0.63	-0.66	0.76	-0.73	1.00																												
Ti	-0.61	<b>0.98</b>	-0.70	<b>-0.98</b>	<b>0.99</b>	-0.80	<b>0.98</b>	-0.75	1.00																											
As	0.73	-0.79	0.31	<b>0.90</b>	<b>-0.90</b>	0.47	<b>-0.95</b>	0.68	<b>-0.88</b>	1.00																										
Ba	-0.49	<b>0.90</b>	-0.67	<b>-0.83</b>	<b>0.84</b>	<b>-0.89</b>	<b>0.87</b>	<b>-0.93</b>	<b>0.90</b>	-0.75	1.00																									
Be	0.58	-0.32	-0.16	0.53	-0.53	-0.15	-0.58	0.11	-0.45	0.75	-0.14	1.00																								
Bi	0.44	-0.62	0.03	0.67	-0.71	0.36	-0.79	0.77	-0.72	<b>0.90</b>	-0.68	0.69	1.00																							
Cd	0.66	-0.77	0.27	<b>0.86</b>	<b>-0.87</b>	0.48	<b>-0.94</b>	0.74	<b>-0.86</b>	<b>0.99</b>	-0.76	0.74	<b>0.94</b>	1.00																						
Co	0.80	-0.63	0.14	<b>0.82</b>	-0.79	0.23	<b>-0.86</b>	0.48	-0.75	<b>0.96</b>	-0.56	<b>0.88</b>	<b>0.83</b>	<b>0.93</b>	1.00																					
Cr	0.47	-0.71	0.18	0.73	-0.77	0.51	<b>-0.85</b>	<b>0.86</b>	-0.79	<b>0.91</b>	-0.79	0.59	<b>0.98</b>	<b>0.96</b>	0.80	1.00																				
Cu	0.36	-0.67	0.14	0.68	-0.70	0.50	-0.76	<b>0.86</b>	-0.75	<b>0.84</b>	-0.78	0.46	<b>0.94</b>	<b>0.86</b>	0.72	<b>0.93</b>	1.00																			
Hf	-0.51	<b>0.97</b>	-0.65	<b>-0.93</b>	<b>0.97</b>	<b>-0.82</b>	<b>0.95</b>	-0.81	<b>0.99</b>	<b>-0.87</b>	<b>0.92</b>	-0.42	-0.77	<b>-0.87</b>	-0.72	<b>-0.84</b>	<b>-0.81</b>	1.00																		
Li	-0.52	<b>0.98</b>	-0.77	<b>-0.93</b>	<b>0.94</b>	<b>-0.90</b>	<b>0.92</b>	-0.81	<b>0.98</b>	-0.79	<b>0.96</b>	-0.26	-0.65	-0.78	-0.62	-0.75	-0.73	<b>0.98</b>	1.00																	
Mn	0.53	<b>-0.96</b>	<b>0.92</b>	<b>0.90</b>	<b>-0.90</b>	<b>0.92</b>	<b>-0.85</b>	0.64	<b>-0.92</b>	0.65	<b>-0.87</b>	0.14	0.41	0.62	0.49	0.54	0.49	<b>-0.89</b>	<b>-0.95</b>	1.00																
Mo	0.74	<b>-0.82</b>	0.36	<b>0.92</b>	<b>-0.91</b>	0.51	<b>-0.97</b>	0.70	<b>-0.90</b>	<b>1.00</b>	-0.78	0.73	<b>0.89</b>	<b>0.99</b>	<b>0.95</b>	<b>0.91</b>	<b>0.82</b>	<b>-0.89</b>	<b>-0.82</b>	0.69	1.00															
Nb	-0.46	<b>0.97</b>	-0.81	<b>-0.89</b>	<b>0.91</b>	<b>-0.94</b>	<b>0.88</b>	-0.81	<b>0.95</b>	-0.72	<b>0.96</b>	-0.15	-0.58	-0.71	-0.53	-0.70	-0.69	<b>0.95</b>	<b>0.99</b>	<b>-0.96</b>	-0.75	1.00														
Ni	<b>0.81</b>	-0.67	0.21	<b>0.85</b>	<b>-0.82</b>	0.26	<b>-0.87</b>	0.45	-0.78	<b>0.96</b>	-0.56	<b>0.87</b>	0.80	<b>0.91</b>	<b>1.00</b>	0.77	0.69	-0.74	-0.64	0.54	<b>0.94</b>	-0.56	1.00													
Pb	0.14	-0.06	-0.50	0.12	-0.16	-0.10	-0.31	0.54	-0.18	0.52	-0.27	0.51	0.79	0.61	0.51	0.74	0.68	-0.26	-0.12	-0.16	0.50	-0.06	0.43	1.00												
Rb	-0.51	<b>0.93</b>	-0.56	<b>-0.89</b>	<b>0.94</b>	-0.76	<b>0.96</b>	<b>-0.83</b>	<b>0.95</b>	<b>-0.90</b>	<b>0.90</b>	-0.50	<b>-0.84</b>	<b>-0.92</b>	-0.75	<b>-0.91</b>	<b>-0.81</b>	<b>0.97</b>	<b>0.93</b>	<b>-0.82</b>	<b>-0.92</b>	<b>0.89</b>	-0.76	-0.41	1.00											
Sb	0.55	-0.75	0.22	0.80	<b>-0.83</b>	0.49	<b>-0.90</b>	0.81	<b>-0.84</b>	<b>0.96</b>	-0.78	0.68	<b>0.98</b>	<b>0.99</b>	<b>0.87</b>	<b>0.99</b>	<b>0.92</b>	<b>-0.87</b>	-0.77	0.58	<b>0.96</b>	-0.71	<b>0.85</b>	0.68	<b>-0.92</b>	1.00										
Sn	0.42	-0.60	0.05	0.63	-0.66	0.43	-0.76	<b>0.86</b>	-0.69	<b>0.85</b>	-0.74	0.55	<b>0.98</b>	<b>0.91</b>	0.76	<b>0.99</b>	<b>0.93</b>	-0.75	-0.66	0.42	<b>0.85</b>	-0.60	0.71	<b>0.83</b>	<b>-0.84</b>	<b>0.96</b>	1.00									
Sr	0.05	0.62	-0.42	-0.44	0.48	-0.77	0.48	<b>-0.88</b>	0.59	-0.40	0.81	0.21	-0.53	-0.45	-0.16	-0.61	-0.75	0.68	0.71	-0.57	-0.41	0.75	-0.15	-0.29	0.62	-0.54	-0.61	1.00								
Ta	-0.49	<b>1.00</b>	-0.76	<b>-0.93</b>	<b>0.96</b>	<b>-0.88</b>	<b>0.93</b>	-0.76	<b>0.99</b>	-0.80	<b>0.92</b>	-0.32	-0.66	-0.79	-0.64	-0.74	-0.72	<b>0.99</b>	<b>0.99</b>	<b>-0.95</b>	<b>-0.82</b>	<b>0.98</b>	-0.67	-0.10	<b>0.94</b>	-0.77	-0.64	0.67	1.00							
Th	-0.53	<b>0.97</b>	-0.66	<b>-0.93</b>	<b>0.95</b>	<b>-0.84</b>	<b>0.94</b>	<b>-0.84</b>	<b>0.98</b>	<b>-0.86</b>	<b>0.95</b>	-0.35	-0.75	<b>-0.85</b>	-0.70	<b>-0.83</b>	<b>-0.82</b>	<b>0.99</b>	<b>0.99</b>	<b>-0.90</b>	<b>-0.87</b>	<b>0.97</b>	-0.72	-0.25	<b>0.95</b>	<b>-0.85</b>	-0.75	0.73	<b>0.98</b>	1.00						
U	0.55	-0.64	0.05	0.73	-0.75	0.33	<b>-0.83</b>	0.71	-0.75	<b>0.95</b>	-0.66	0.77	<b>0.99</b>	<b>0.97</b>	<b>0.91</b>	<b>0.96</b>	<b>0.91</b>	-0.78	-0.66	0.44	<b>0.93</b>	-0.58	<b>0.88</b>	0.75	<b>-0.84</b>	<b>0.98</b>	<b>0.95</b>	-0.44	-0.67	-0.76	1.00					
V	0.51	-0.67	0.11	0.73	-0.76	0.42	<b>-0.84</b>	0.80	-0.77	<b>0.93</b>	-0.74	0.67	<b>0.99</b>	<b>0.97</b>	<b>0.86</b>	<b>0.99</b>	<b>0.94</b>	<b>-0.81</b>	-0.71	0.49	<b>0.93</b>	-0.64	<b>0.82</b>	0.75	<b>-0.87</b>	<b>0.99</b>	<b>0.98</b>	-0.55	-0.71	-0.80	<b>0.99</b>	1.00				
W	0.58	-0.67	0.16	0.73	-0.74	0.47	<b>-0.85</b>	<b>0.85</b>	-0.76	<b>0.91</b>	-0.78	0.60	<b>0.95</b>	<b>0.95</b>	<b>0.82</b>	<b>0.98</b>	<b>0.89</b>	-0.79	-0.71	0.52	<b>0.92</b>	-0.66	0.78	0.75	<b>-0.88</b>	<b>0.97</b>	<b>0.98</b>	-0.54	-0.69	-0.79	<b>0.95</b>	<b>0.97</b>	1.00			
Zn	0.42	-0.55	-0.04	0.61	-0.64	0.32	-0.74	0.78	-0.66	<b>0.86</b>	-0.66	0.65	<b>0.99</b>	<b>0.92</b>	0.80	<b>0.97</b>	<b>0.93</b>	-0.72	-0.59	0.35	<b>0.85</b>	-0.53	0.75	<b>0.85</b>	-0.80	<b>0.96</b>	<b>0.99</b>	-0.53	-0.59	-0.70	<b>0.97</b>	<b>0.99</b>	<b>0.96</b>	1.00		
Zr	-0.48	<b>0.96</b>	-0.67	<b>-0.89</b>	<b>0.92</b>	<b>-0.88</b>	<b>0.92</b>	<b>-0.88</b>	<b>0.97</b>	<b>-0.82</b>	<b>0.97</b>	-0.28	-0.74	<b>-0.83</b>	-0.64	<b>-0.83</b>	-0.81	<b>0.98</b>	<b>0.99</b>	<b>-0.90</b>	<b>-0.84</b>	<b>0.98</b>	-0.65	-0.27	<b>0.96</b>	<b>-0.84</b>	-0.76	0.77	<b>0.98</b>	<b>0.99</b>	-0.73	-0.79	-0.80	-0.70	1.00	
Sc	0.52	<b>-0.98</b>	<b>0.88</b>	<b>0.92</b>	<b>-0.93</b>	<b>0.90</b>	<b>-0.88</b>	0.65	<b>-0.95</b>	0.70	<b>-0.88</b>	0.20	0.48	0.67	0.54	0.59	0.56	<b>-0.92</b>	<b>-0.97</b>	<b>0.99</b>	0.73	<b>-0.97</b>	0.59	-0.11	<b>-0.85</b>	0.63	0.47	-0.59	<b>-0.97</b>	<b>-0.93</b>	0.50	0.54	0.55	0.40	<b>-0.92</b>	1.00

Table S3 - Pearson's correlation coefficients for size-fractions of Fe-MC.

	Ctot	Ag	Al	Ca	Fe	K	Mg	Na	P	Ti	As	Ba	Be	Cd	Co	Cr	Cu	Hf	Li	Mn	Mo	Nb	Ni	Pb	Rb	Sb	Sn	Sr	Ta	Th	U	V	W	Zn	Zr	Sc
Ctot	1.00																																			
Ag	-0.16	1.00																																		
Al	-0.28	0.33	1.00																																	
Ca	0.37	-0.02	<b>-0.81</b>	1.00																																
Fe	0.07	0.30	<b>-0.68</b>	<b>0.72</b>	1.00																															
K	-0.14	-0.05	<b>0.86</b>	<b>-0.83</b>	<b>-0.93</b>	1.00																														
Mg	0.02	0.31	<b>-0.70</b>	<b>0.81</b>	<b>0.97</b>	<b>-0.94</b>	1.00																													
Na	-0.02	-0.15	<b>0.75</b>	<b>-0.66</b>	<b>-0.93</b>	<b>0.93</b>	<b>-0.91</b>	1.00																												
P	-0.15	<b>0.86</b>	0.10	0.19	0.45	-0.21	0.44	-0.30	1.00																											
Ti	-0.45	0.13	<b>0.91</b>	<b>-0.87</b>	<b>-0.82</b>	<b>0.93</b>	<b>-0.81</b>	<b>0.80</b>	-0.05	1.00																										
As	0.07	<b>0.75</b>	-0.13	0.31	<b>0.66</b>	-0.43	<b>0.59</b>	-0.50	<b>0.91</b>	-0.33	1.00																									
Ba	-0.47	0.27	<b>0.80</b>	<b>-0.69</b>	<b>-0.71</b>	<b>0.83</b>	<b>-0.67</b>	<b>0.70</b>	0.14	<b>0.91</b>	-0.18	1.00																								
Be	-0.03	<b>0.76</b>	0.38	-0.08	0.04	0.20	0.04	0.06	<b>0.84</b>	0.26	<b>0.67</b>	0.44	1.00																							
Cd	0.06	<b>0.83</b>	-0.05	0.29	0.54	-0.34	0.51	-0.36	<b>0.94</b>	-0.24	<b>0.96</b>	-0.06	<b>0.71</b>	1.00																						
Co	-0.24	<b>0.63</b>	-0.19	0.23	<b>0.81</b>	<b>-0.59</b>	<b>0.71</b>	<b>-0.70</b>	<b>0.69</b>	-0.37	<b>0.81</b>	-0.30	0.32	<b>0.72</b>	1.00																					
Cr	-0.13	<b>0.83</b>	0.00	0.16	<b>0.64</b>	-0.38	<b>0.57</b>	-0.50	<b>0.90</b>	-0.21	<b>0.95</b>	-0.08	<b>0.68</b>	<b>0.90</b>	<b>0.89</b>	1.00																				
Cu	-0.45	<b>0.87</b>	0.29	-0.12	0.39	-0.13	0.37	-0.34	<b>0.81</b>	0.15	<b>0.69</b>	0.25	<b>0.63</b>	<b>0.70</b>	<b>0.78</b>	<b>0.84</b>	1.00																			
Hf	-0.50	0.06	<b>0.80</b>	<b>-0.79</b>	<b>-0.80</b>	<b>0.85</b>	<b>-0.77</b>	<b>0.72</b>	-0.12	<b>0.94</b>	-0.44	<b>0.93</b>	0.18	-0.32	-0.41	-0.29	0.13	1.00																		
Li	0.01	0.00	<b>0.86</b>	<b>-0.80</b>	<b>-0.82</b>	<b>0.91</b>	<b>-0.88</b>	<b>0.90</b>	-0.15	<b>0.80</b>	-0.27	<b>0.67</b>	0.19	-0.19	-0.43	-0.24	-0.12	<b>0.68</b>	1.00																	
Mn	0.22	0.09	<b>-0.82</b>	<b>0.90</b>	<b>0.92</b>	<b>-0.96</b>	<b>0.96</b>	<b>-0.87</b>	0.26	<b>-0.93</b>	0.45	<b>-0.80</b>	-0.09	0.36	0.53	0.38	0.09	<b>-0.89</b>	<b>-0.89</b>	1.00																
Mo	0.31	<b>0.62</b>	-0.29	0.45	<b>0.73</b>	-0.55	<b>0.65</b>	<b>-0.60</b>	<b>0.78</b>	-0.53	<b>0.95</b>	-0.38	<b>0.58</b>	<b>0.88</b>	<b>0.76</b>	<b>0.87</b>	0.54	<b>-0.61</b>	-0.37	<b>0.59</b>	1.00															
Nb	-0.49	0.22	<b>0.87</b>	<b>-0.86</b>	<b>-0.70</b>	<b>0.85</b>	<b>-0.73</b>	<b>0.67</b>	0.08	<b>0.95</b>	-0.18	<b>0.94</b>	0.35	-0.10	-0.19	-0.05	0.31	<b>0.94</b>	<b>0.75</b>	<b>-0.89</b>	-0.38	1.00														
Ni	-0.25	<b>0.70</b>	-0.15	0.25	<b>0.80</b>	<b>-0.57</b>	<b>0.73</b>	<b>-0.70</b>	<b>0.72</b>	-0.34	<b>0.80</b>	-0.24	0.38	<b>0.73</b>	<b>0.99</b>	<b>0.90</b>	<b>0.84</b>	-0.36	-0.45	0.53	<b>0.74</b>	-0.16	1.00													
Pb	-0.19	<b>0.82</b>	0.46	-0.30	0.13	0.18	0.04	0.01	<b>0.84</b>	0.30	<b>0.78</b>	0.41	<b>0.83</b>	<b>0.78</b>	<b>0.59</b>	<b>0.82</b>	<b>0.78</b>	0.18	0.28	-0.16	<b>0.63</b>	0.45	<b>0.60</b>	1.00												
Rb	-0.47	0.08	<b>0.80</b>	<b>-0.68</b>	<b>-0.75</b>	<b>0.85</b>	<b>-0.70</b>	<b>0.72</b>	-0.06	<b>0.92</b>	-0.39	<b>0.94</b>	0.26	-0.31	-0.42	-0.28	0.11	<b>0.93</b>	<b>0.64</b>	<b>-0.80</b>	<b>-0.56</b>	<b>0.89</b>	-0.36	0.19	1.00											
Sb	-0.07	<b>0.82</b>	-0.03	0.20	<b>0.60</b>	-0.35	0.53	-0.46	<b>0.94</b>	-0.20	<b>0.98</b>	-0.03	<b>0.73</b>	<b>0.95</b>	<b>0.83</b>	<b>0.97</b>	<b>0.80</b>	-0.29	-0.23	0.36	<b>0.90</b>	-0.03	<b>0.83</b>	<b>0.85</b>	-0.25	1.00										
Sn	-0.12	<b>0.83</b>	0.07	0.08	0.55	-0.27	0.47	-0.42	<b>0.92</b>	-0.12	<b>0.96</b>	0.01	<b>0.74</b>	<b>0.91</b>	<b>0.83</b>	<b>0.98</b>	<b>0.83</b>	-0.22	-0.15	0.28	<b>0.87</b>	0.04	<b>0.84</b>	<b>0.89</b>	-0.20	<b>0.98</b>	1.00									
Sr	-0.41	<b>0.59</b>	<b>0.63</b>	-0.43	-0.26	0.49	-0.27	0.28	<b>0.59</b>	<b>0.65</b>	0.32	<b>0.81</b>	<b>0.70</b>	0.40	0.18	0.38	<b>0.65</b>	<b>0.66</b>	0.38	-0.49	0.12	<b>0.79</b>	0.25	<b>0.73</b>	<b>0.68</b>	0.45	0.47	1.00								
Ta	-0.42	-0.02	<b>0.76</b>	<b>-0.83</b>	<b>-0.77</b>	<b>0.87</b>	<b>-0.80</b>	<b>0.70</b>	-0.08	<b>0.91</b>	-0.31	<b>0.89</b>	0.20	-0.25	-0.36	-0.25	0.08	<b>0.90</b>	<b>0.74</b>	<b>-0.90</b>	-0.49	<b>0.95</b>	-0.35	0.30	<b>0.88</b>	-0.18	-0.12	<b>0.69</b>	1.00							
Th	<b>-0.68</b>	0.47	<b>0.65</b>	-0.44	-0.23	0.45	-0.20	0.25	0.44	<b>0.68</b>	0.14	<b>0.80</b>	0.51	0.17	0.18	0.27	<b>0.62</b>	<b>0.69</b>	0.30	-0.42	-0.09	<b>0.77</b>	0.24	<b>0.56</b>	<b>0.79</b>	0.29	0.34	<b>0.88</b>	<b>0.68</b>	1.00						
U	-0.20	<b>0.78</b>	0.01	0.12	<b>0.60</b>	-0.33	0.52	-0.49	<b>0.91</b>	-0.15	<b>0.94</b>	0.00	<b>0.68</b>	<b>0.88</b>	<b>0.88</b>	<b>0.97</b>	<b>0.85</b>	-0.23	-0.22	0.32	<b>0.85</b>	0.04	<b>0.88</b>	<b>0.86</b>	-0.20	<b>0.98</b>	<b>0.98</b>	0.49	-0.11	0.38	1.00					
V	-0.15	<b>0.79</b>	-0.01	0.14	<b>0.64</b>	-0.37	<b>0.55</b>	-0.51	<b>0.90</b>	-0.20	<b>0.96</b>	-0.08	<b>0.66</b>	<b>0.89</b>	<b>0.90</b>	<b>0.99</b>	<b>0.83</b>	-0.30	-0.24	0.37	<b>0.87</b>	-0.03	<b>0.89</b>	<b>0.84</b>	-0.28	<b>0.98</b>	<b>0.99</b>	0.40	-0.19	0.29	<b>0.99</b>	1.00				
W	-0.26	<b>0.66</b>	0.40	-0.33	0.18	0.12	0.06	-0.11	<b>0.73</b>	0.25	<b>0.70</b>	0.33	<b>0.78</b>	<b>0.61</b>	<b>0.62</b>	<b>0.80</b>	<b>0.75</b>	0.16	0.20	-0.12	<b>0.59</b>	0.43	<b>0.61</b>	<b>0.92</b>	0.18	<b>0.77</b>	<b>0.85</b>	<b>0.64</b>	0.27	<b>0.55</b>	<b>0.83</b>	<b>0.81</b>	1.00			
Zn	-0.22	<b>0.85</b>	0.18	-0.04	0.46	-0.17	0.38	-0.34	<b>0.91</b>	0.00	<b>0.91</b>	0.14	<b>0.77</b>	<b>0.88</b>	<b>0.82</b>	<b>0.97</b>	<b>0.88</b>	-0.08	-0.06	0.17	<b>0.79</b>	0.18	<b>0.83</b>	<b>0.93</b>	-0.08	<b>0.96</b>	<b>0.99</b>	<b>0.56</b>	-0.01	0.44	<b>0.98</b>	<b>0.97</b>	<b>0.89</b>	1.00		
Zr	-0.49	0.08	<b>0.86</b>	<b>-0.84</b>	<b>-0.79</b>	<b>0.89</b>	<b>-0.77</b>	<b>0.73</b>	-0.10	<b>0.97</b>	-0.39	<b>0.92</b>	0.18	-0.31	-0.37	-0.26	0.16	<b>0.97</b>	<b>0.73</b>	<b>-0.90</b>	<b>-0.57</b>	<b>0.96</b>	-0.33	0.24	<b>0.95</b>	-0.25	-0.17	<b>0.67</b>	<b>0.95</b>	<b>0.73</b>	-0.18	-0.24	0.21	-0.04	1.00	
Sc	-0.11	<b>0.65</b>	-0.40	<b>0.57</b>	<b>0.89</b>	<b>-0.75</b>	<b>0.91</b>	<b>-0.80</b>	<b>0.72</b>	<b>-0.56</b>	<b>0.79</b>	-0.40	0.36	<b>0.74</b>	<b>0.86</b>	<b>0.83</b>	<b>0.68</b>	<b>-0.57</b>	<b>-0.69</b>	<b>0.78</b>	<b>0.79</b>	-0.45	<b>0.89</b>	0.41	-0.51	<b>0.79</b>	<b>0.76</b>	0.04	<b>-0.61</b>	0.07	<b>0.78</b>	<b>0.81</b>	0.40	<b>0.70</b>	<b>-0.56</b>	1.00