

Physical and chemical characterization of McIntyre Powder: An aluminum dust inhaled by miners to combat silicosis: Supplementary Materials

Supplementary Table A – Elements displaying significantly lower concentrations in light grey McIntyre Powder (MP) samples (compared to black MP). Mean and std dev concentrations (ppm) were determined in triplicate subsamples of light grey MP using ICP. USW1-USW4 refer to four containers of light grey MP provided by United Steel Workers (shaded rows show the mean, std dev and %RSD for all four samples combined).

Concentrations in ppm	Al	Ba	Ca	Cu	Fe	Ga	Hf	Mg	Mn	Mo	Si	U	Zn
USW1													
Mean	324701	0.11	0.03	16.5	1078	82.3	0.74	215	9.19	0.50	300	0.43	12.4
Std Dev	7538	0.07	0.01	3.4	17	0.5	0.01	24	0.10	0.01	21.4	0.00	2.0
% RSD	2%	62%	34%	21%	2%	1%	2%	11%	1%	3%	7%	1%	16%
USW2													
Mean	326166	0.11	0.02	14.2	1080	81.3	0.73	179	9.34	0.48	278	0.43	10.5
Std Dev	1385	0.02	0.00	1.2	35	0.8	0.00	14	0.19	0.00	8.6	0.00	0.7
% RSD	0.4%	22%	16%	9%	3%	1%	1%	8%	2%	0.4%	3%	0.3%	7%
USW3													
Mean	315593	0.10	0.03	13.7	1085	80.2	0.71	170	9.44	0.47	269	0.43	9.2
Std Dev	6221	0.02	0.02	0.2	2.2	0.9	0.01	4.3	0.12	0.01	4.5	0.00	0.3
% RSD	2%	16%	79%	2%	0.2%	1%	1%	3%	1%	2%	2%	1%	3%
USW4													
Mean	328265	0.09	0.02	13.5	1140	80.5	0.73	155	9.74	0.47	281	0.45	9.7
Std Dev	3764	0.05	0.00	0.2	50	0.3	0.03	7.3	0.30	0.01	6.7	0.03	0.6
% RSD	1%	52%	27%	1%	4%	0.4%	4%	5%	3%	1%	2%	6%	7%
USW1-USW4 (all four light grey samples)													
Mean	323681	0.10	0.02	14.5	1096	81.1	0.7	180	9.4	0.48	282	0.43	10.4
Std Dev	5587	0.01	0.00	1.4	29.8	0.9	0.0	25.4	0.2	0.01	13.0	0.01	1.4
% RSD	2%	10%	19%	9%	3%	1%	2%	14%	2%	3%	5%	2%	14%

Supplementary Table B – Elements displaying no significant difference in concentration between light grey McIntyre Powder (MP) and black MP. Mean and std dev concentrations (ppm) were determined in triplicate subsamples of light grey MP using ICP. USW1-USW4 refer to four containers of light grey MP provided by United Steel Workers (shaded rows show the mean, std dev and %RSD for all four samples combined).

Concentrations in ppm	B	Br	Ce	Cr	Na	Ni	Pb	Sn	Sr	Ti	V	Zr
USW1												
Mean	1.7	4.6	2.9	11.0	7.3	18.8	28.8	4.5	0.05	44.9	70.7	18.3
Std Dev	0.1	0.7	1.7	8.4	0.3	18.7	31.2	0.3	0.01	10.3	1.2	0.71
% RSD	7%	16%	59%	76%	5%	99%	108%	6%	23%	23%	2%	4%
USW2												
Mean	1.3	7.0	1.7	4.3	7.4	8.1	4.3	4.0	0.05	34.6	75.3	17.9
Std Dev	0.3	2.3	0.3	0.2	0.1	0.1	0.3	0.3	0.01	1.7	4.0	0.05
% RSD	19.9%	33%	15%	5%	2%	1%	8%	7%	11%	5.0%	5%	0.3%
USW3												
Mean	1.1	8.4	1.7	6.3	7.5	8.3	10.3	4.9	0.04	35.0	77.6	17.8
Std Dev	0.3	1.1	0.2	0.7	0.1	0.4	2.2	0.8	0.01	4.0	3.0	0.34
% RSD	23%	13%	9%	12%	0.9%	4%	22%	16%	29%	11%	4%	2%
USW4												
Mean	6.5	6.7	1.9	8.4	7.5	8.0	14.5	5.8	0.18	45.2	76.6	19.1
Std Dev	5.6	0.6	0.6	3.4	0	0.2	7.5	1.4	0.26	11.0	1.3	1.40
% RSD	86%	9%	32%	40%	2%	2.4%	52%	25%	142%	24%	2%	7%
USW1-USW4 (all four light grey samples)												
Mean	2.6	6.7	2.0	7.5	7.4	10.8	14.5	4.8	0.08	39.9	75.0	18.3
Std Dev	2.6	1.6	0.6	2.9	0.1	5.4	10.4	0.8	0.07	5.9	3.0	0.6
% RSD	98%	23%	28%	38%	1%	50%	72%	16%	84%	15%	4%	3%