

Article

A Toxicological Study of the Respirable Coal Mine Dust: Assessment of Different Dust Sources within the Same Mine

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Citation: Das, M.; Salinas, V.; LeBoeuf, J.; Khan, R.; Jacquez, Q.; Camacho, A.; Hovingh, M.; Zychowski, K.; Rezaee, M.; Roghanchi, P.; et al. A Toxicological Study of the Respirable Coal Mine Dust: Assessment of Different Dust Sources within the Same Mine. *Minerals* 2023, 13, 433. <https://doi.org/10.3390/min13030433>

Academic Editor: Fernando Rocha and Carla Candeias

Received: 28 February 2023

Revised: 14 March 2023

Accepted: 17 March 2023

Published: 18 March 2023



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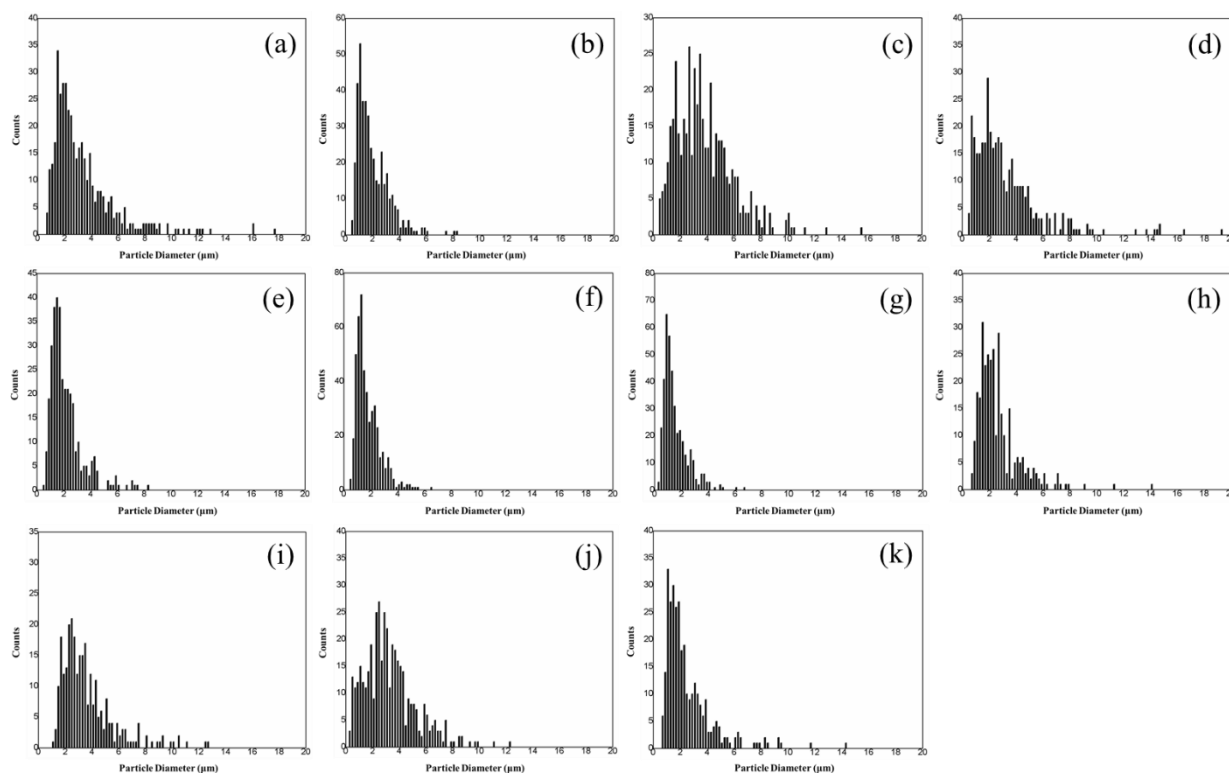


Figure S1: Particle size distribution, prepared from the SEM images, for samples (a) Mine 1_Coal (b) Mine 1_Floor (c) Mine 1_RD (d) Mine 1_Roof (e) Mine 2_Coal (f) Mine 2_Floor (g) Mine 2_Roof (h) Mine 3_Coal (i) Mine 3_Floor (j) Mine 3_RD (k) Mine 3_Roof.

Table S1: BET surface area measurements for the coal dust samples.

Samples	Average Surface area (m ² /g)
Mine 1_Coal	6.91 ± 0.15
Mine 1_Floor	10.01 ± 0.17
Mine 1_RD	4.72 ± 0.03
Mine 1_Roof	18.59 ± 0.14
Mine 2_Coal	8.46 ± 0.15
Mine 2_Floor	38.46 ± 0.19
Mine 2_Roof	39.85 ± 0.26
Mine 3_Coal	6.89 ± 0.14
Mine 3_Floor	37.25 ± 0.09
Mine 3_RD	4.10 ± 0.05
Mine 3_Roof	14.76 ± 0.04

Table S2: FTIR peak assignments.

Experimental Peaks at cm ⁻¹	Standard Peaks at cm ⁻¹	Peak assignments
779 & 799	800 & 780	Silica
713	718	N-H bending
878	878	C-O bonds in carbonates
915	915	Kaolinite
950-1150	-	Si=O, Si-O-Si, Si-O-C, C-O-C
1445	1445	Antisymmetric –CH ₃ deformation
1415	1412	C-N/N-H for nitrates

Table S3: Elemental composition of samples.

Samples	% elemental concentration								
	Al	Si	Cr	Mn	Fe	Cu	Sr	Ba	Pb
Mine 1_Coal	1.307	5.276	0.002	0.000	0.121	0.002	0.004	0.022	0.004
Mine 1_Floor	0.793	27.233	0.004	0.001	0.201	0.001	0.002	0.023	0.001
Mine 1_RD	0.020	1.457	0.000	0.039	0.177	0.001	0.004	0.001	0.013
Mine 1_Roof	0.802	25.434	0.006	0.072	2.064	0.003	0.008	0.030	0.002
Mine 2_Coal	0.114	0.507	0.001	0.000	0.190	0.001	0.010	0.003	0.005
Mine 2_Floor	0.481	24.997	0.009	0.016	1.687	0.004	0.005	0.034	0.002
Mine 2_Roof	0.646	23.786	0.009	0.006	1.105	0.005	0.026	0.044	0.003
Mine 3_Coal	1.115	4.331	0.004	0.001	0.677	0.002	0.001	0.005	0.024
Mine 3_Floor	0.771	23.469	0.012	0.004	1.893	0.008	0.035	0.044	0.007
Mine 3_RD	0.060	1.614	0.000	0.006	0.158	0.000	0.009	0.001	0.000
Mine 3_Roof	0.693	17.016	0.008	0.018	9.364	0.005	0.008	0.034	0.022
SRM_CLB 1	0.633	1.227	0.001	0.001	0.810	0.001	0.006	0.004	0.001

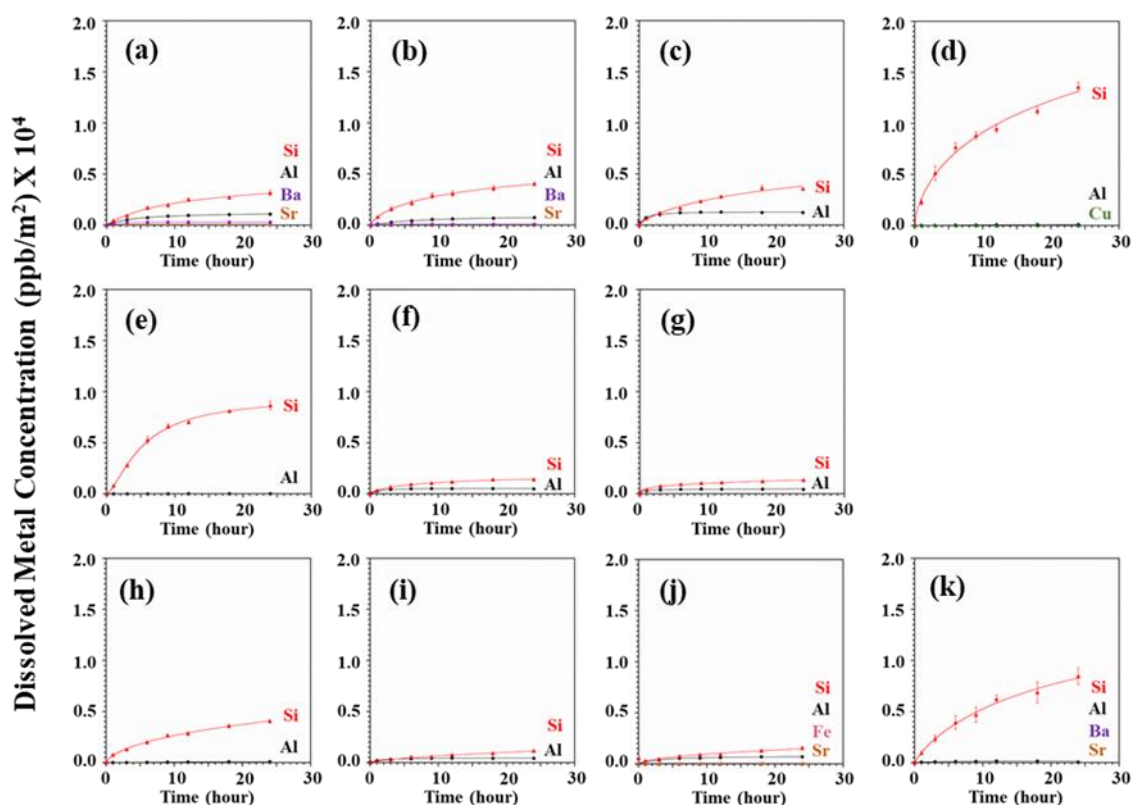


Figure S2: Surface area normalized dissolution of elements in GS from samples (a) Mine 1_Coal (b) Mine 1_Floor (c) Mine 1_Roof (d) Mine 1_RD (e) Mine 2_Coal (f) Mine 2_Floor (g) Mine 2_Roof (h) Mine 3_Coal (i) Mine 3_Floor (j) Mine 3_Roof (k) Mine 3_RD.

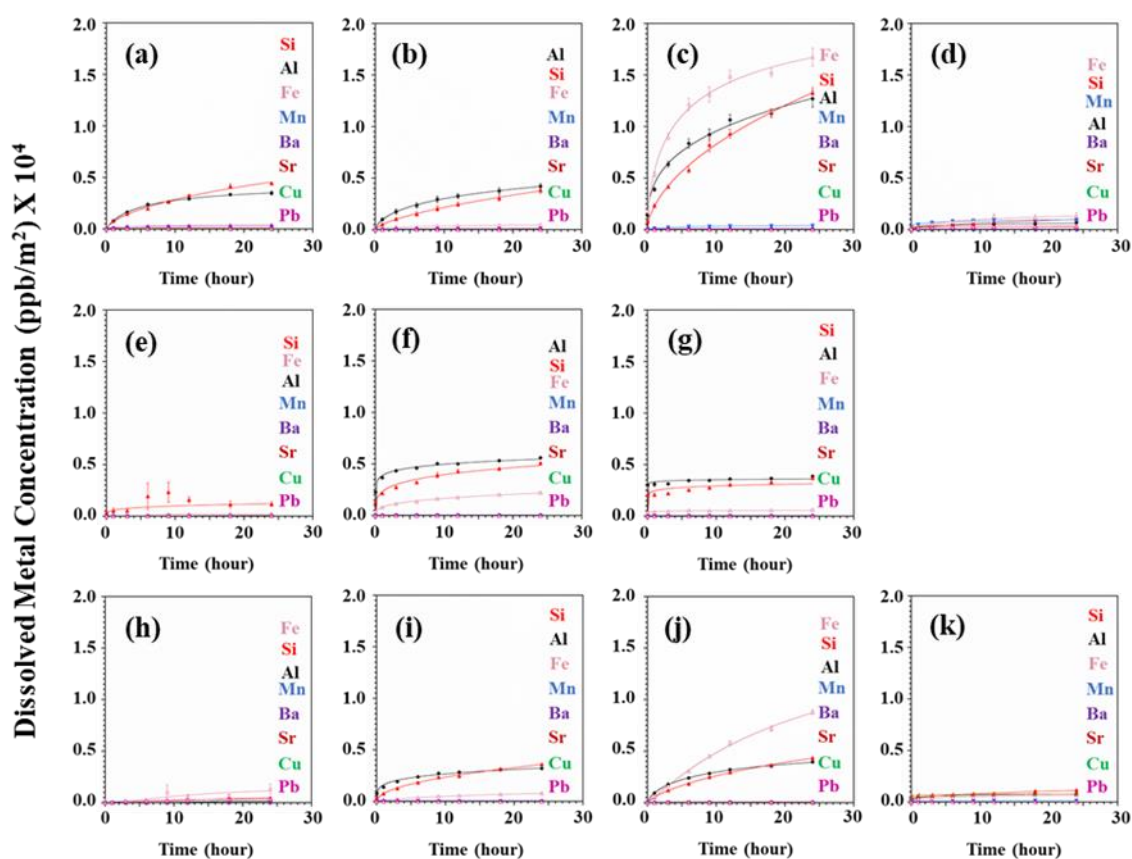


Figure S3: Surface area normalized dissolution of elements in ALF from samples (a) Mine 1_Coal (b) Mine 1_Floor (c) Mine 1_Roof (d) Mine 1_RD (e) Mine 2_Coal (f) Mine 2_Floor (g) Mine 2_Roof (h) Mine 3_Coal (i) Mine 3_Floor (j) Mine 3_Roof (k) Mine 3_RD.

Table S4: Surface area normalized dissolved of metals in GS and ALF following 24 hours dissolution experiments.

Samples	Al		Si		Mn		Fe		Cu		Sr		Ba		Pb	
	ALF	GS	ALF	GS	ALF	GS	ALF	GS	ALF	GS	ALF	GS	ALF	GS	ALF	GS
Mine 1_Coal	3496	1084	4432	3165	3	-	433	-	7	-	106	142	302	297	39	-
Mine 1_Floor	4206	739	3822	4028	5	-	463	-	17	-	54	39	140	56	3	-
Mine 1_RD	678	117	994	13580	921	-	1326	-	36	27	273	-	69	-	310	-
Mine 1_Roof	12706	1232	13258	3538	397	-	16750	-	9	-	47	-	111	-	6	-
Mine 2_Coal	31	15	1183	8658	3	-	258	-	83	-	37	-	32	-	53	-
Mine 2_Floor	5621	487	5091	1412	17	-	2227	-	4	-	8	-	56	-	3	-
Mine 2_Roof	3881	424	3702	1345	2	-	626	-	7	-	13	-	58	-	3	-
Mine 3_Coal	178	97	466	4058	4	-	1331	-	114	-	30	-	22	-	378	-
Mine 3_Floor	3207	436	3592	1151	3	-	787	-	10	-	21	-	58	-	8	-
Mine 3_RD	800	58	1163	8463	139	-	670	-	36	-	758	-	8	-	8	-
Mine 3_Roof	3966	696	4343	1564	25	-	8793	83	7	-	15	11	67	-	71	-