

SUPPLEMENTARY MATERIALS

Article

The Use of Mining Waste Materials for the Treatment of Acid and Alkaline Mine Wastewater

Jacek Retka ^{1,*}, Grzegorz Rzepa ², Tomasz Bajda ² and Lukasz Drewniak ¹

¹ Institute of Microbiology, Faculty of Biology, University of Warsaw, Miecznikowa 1, 02-096 Warsaw, Poland; ldrewniak@biol.uw.edu.pl

² Faculty of Geology, Geophysics and Environmental Protection, Department of Mineralogy, Petrography and Geochemistry, AGH University of Science and Technology, al. Mickiewicza 30, 30-059 Krakow, Poland; rzepa@agh.edu.pl (G.R.); bajda@agh.edu.pl (T.B.)

* Correspondence: jretka@biol.uw.edu.pl

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Table S1. Monitoring results of AMD

	pH	Conductivity	Al	Ca	Cd	Co	Cu	Fe	Mg	Mn	Ni	SiO ₂	Sr	Zn	Cl ⁻	NO ₃ ⁻	SO ₄ ²⁻
		mS·cm ⁻¹	mg·L ⁻¹														
18 February	3.09	9.05	119	386	1.13	0.68	1.30	145	1219	295	1.13	78.0	1.68	1044	29.2	56.1	9300
18 April	3.02	9.64	136	399	1.27	0.70	1.42	172	1389	339	1.20	89.0	1.70	1228	14.7	26.9	10,200
18 May	3.00	8.39	98.9	386	0.86	0.56	0.89	127	1086	255	0.92	74.9	1.81	878	12.0	122	8467
18 June	3.11	7.78	117	400	1.01	0.59	1.72	123	973	229	1.03	77.7	1.73	849	17.2	13.6	7367
18 July	3.03	9.34	137	407	1.22	0.75	1.11	165	1396	336	1.12	92.7	1.72	1248	27.8	1.58	10,333
18 August	3.06	7.36	102	395	0.89	<0.2	0.74	121	1085	250	<0.5	71.7	1.81	917	23.3	1.59	8000
18 September	3.06	6.02	67.9	354	0.64	0.45	0.65	89.7	695	163	0.78	56.9	1.76	576	19.7	1.20	5400
18 October	3.25	4.47	33.6	357	0.50	0.31	0.56	48.6	490	97	0.53	38.8	1.80	357	21.0	0.65	3700
18 November	3.26	4.47	33.8	360	0.52	0.32	0.59	47.5	491	97	0.55	39.5	1.82	367	20.5	0.60	3700
18 December	3.19	3.20	77.3	402	0.73	0.38	2.02	93.1	593	125	0.65	58.1	1.73	507	22.8	<3.00	5000
19 January	3.13	4.45	109	405	1.29	0.49	4.00	139	827	184	0.93	70.3	1.80	747	85.3	63.3	6567
19 February	3.15	4.98	127	384	1.41	0.63	3.49	107	964	224	0.95	76.5	1.83	957	<15.0	12.4	7800
Minimum	3.00	3.20	33.6	354	0.50	<0.2	0.56	47.5	490	97	<0.5	38.8	1.68	357	12.0	0.60	3700
Maximum	3.26	9.64	137	407	1.41	0.75	4.00	172	1396	339	1.20	92.7	1.83	1248	85.3	122	10,333
Average	3.11	6.22	88.0	386	0.90	0.51	1.25	107	880	199	0.86	66.4	1.77	746	23.0	7.10	6769

< below limits of quantification

Table S2. Monitoring results of tailings

	pH	Conductivity	Al	Ba	Ca	K	Na	Pb	SiO ₂	Sr	Zn	Cl ⁻	NO ₃ ⁻	SO ₄ ²⁻
		mS·cm ⁻¹												
18 February	11.90	3.86	0.20	0.12	494	32.5	61.1	1.13	2.77	0.62	0.07	12.8	4.58	499
18 April	11.97	3.02	0.41	0.08	447	23.7	52.7	1.50	3.53	0.56	0.06	11.0	3.86	660
18 May	12.45	5.04	0.19	0.13	691	34.0	62.9	3.48	1.90	0.99	0.07	14.2	5.52	883
18 June	12.56	3.36	0.16	0.09	415	20.6	32.3	1.78	1.60	0.52	0.09	13.0	1.98	440
18 July	12.45	3.32	0.28	0.11	472	30.9	44.0	1.32	2.67	0.69	0.19	6.02	1.78	650
18 August	11.99	3.23	0.27	0.12	508	33.4	60.5	1.70	1.87	0.76	0.06	5.72	2.20	720
18 September	12.32	3.54	0.13	0.12	586	38.5	75.9	1.17	1.83	0.98	0.03	7.76	3.04	1100
18 October	12.34	3.83	0.18	0.13	598	41.4	82.5	1.10	1.97	1.02	0.05	10.5	3.52	967
18 November	12.52	3.82	0.17	0.13	597	41.4	82.6	1.10	2.00	1.02	0.04	10.5	3.48	980
18 December	11.42	1.13	0.12	0.06	341	40.5	77.0	0.03	3.07	0.75	0.20	7.15	<3.00	847
19 January	11.32	0.99	0.06	0.07	285	20.9	42.7	0.04	2.52	0.54	0.06	9.25	2.94	643
19 February	11.96	1.70	0.43	0.12	506	31.6	66.0	0.23	4.80	1.13	0.43	<15.0	2.05	1100
Minimum	11.32	0.99	0.06	0.06	285	20.6	32.3	0.03	1.60	0.52	0.03	5.72	1.78	440
Maximum	12.56	5.04	0.43	0.13	691	41.4	82.6	3.48	4.80	1.13	0.43	14.2	5.52	1100
Average	12.09	2.77	0.19	0.10	482	31.6	59.5	0.68	2.42	0.77	0.08	9.40	2.99	760

< below limits of quantification

Table S3. Titration of tailings using acid mine drainage (collected in February and April) from the adit

AMD (L ⁻¹)	February		April	
	pH	SO ₄ ²⁻ (mg·L ⁻¹)	pH	SO ₄ ²⁻ (mg·L ⁻¹)
0	11.98		11.66	
1	11.42		10.76	
2	9.04	1470	9.80	
2.5	8.60		8.92	1550
3	7.94	1662	8.74	
3.5	7.75		8.62	
4	7.57		8.46	
4.5	7.50		8.32	
5	7.44		7.84	1956
5.5	7.23		7.48	
6	7.09	2228	7.35	
6.5	6.90		7.21	
7	6.76		7.13	2428

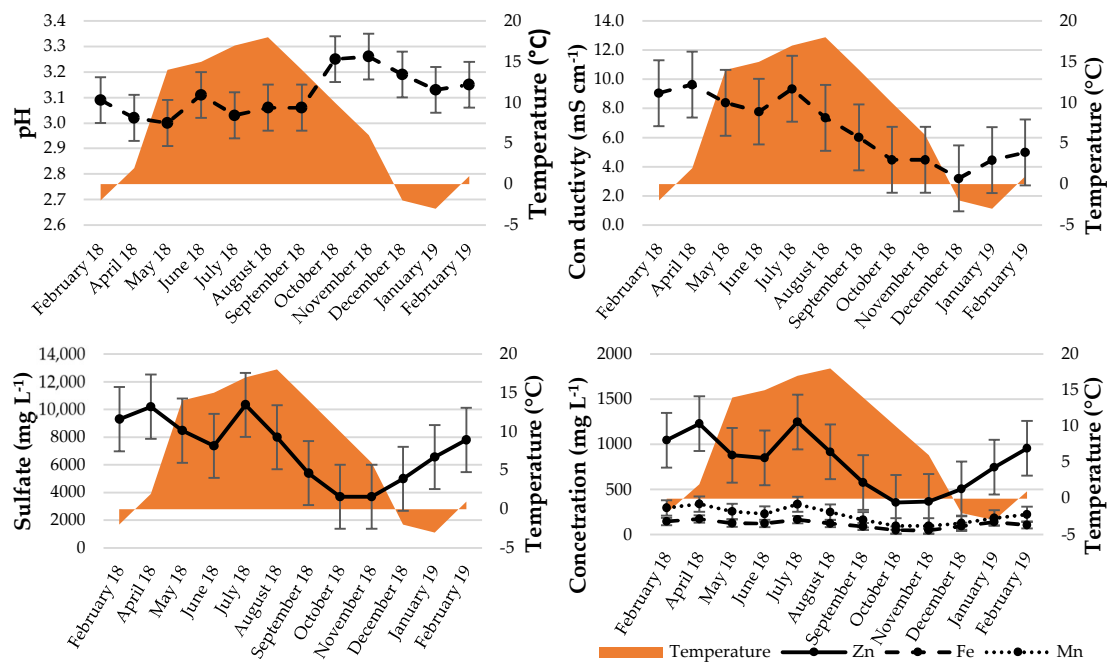


Figure S1. Evolution of selected parameters in acid mine drainage (AMD) with temperature data.