Microecology perspective and environmental impact of coal mine sulfur-bearing waste dump

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Coal mines in Chian are mostly located in the north. Below the coal layer, there is a fracture-karst aquifer with strong anisotropy often used as drinking water source for local inhabitants[1-2]. Mining has caused environmental pollution. Some studies involve flow and solute transportant in fractured media[3-7]. Others pay attentions to the pollution control from sources [8]. In this study, by hydrogeological survey, sampling and testing in the sulfur-containing waste dump of the mining area in Sitai mine, Shanxi Province, the content of the material and its environmental characteristics were analyzed. The advantage of microbial flora in the sulfur-containing waste dump and its colony structure were discussed. The 16S rDNA of the special microorganisms was determined; The role of microorganisms and kinetic parameters in the weathering process of sulphide were studied.

The pH values of leaching water in the yard of sulfur containing waste dump were around 2.5, the color of leaching filtrate were almost reddish-brown.

The 9 strains which isolated from the acid water belonged to two species: *Acidiphilium sp.* and *Acidithiobacillus ferrooxidans*, they were the advantage microbial flora in this environment.

The initial pH of liquid phase, temperature, solid-liquid ratio and particle sizes of mining rocks would affect the behavior of microorganisms in the process of pyrite weathering.

When microorganisms and culture medium were coexist, the pyrite oxidation rate reached 3.14 mmol.d-1.L-1, it was 28.55 times of the control group. the release regularities of As, Cu, Zn, Ni, Pb influenced obviously by microorganisms.

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Precious metal (Pt, Pd, and Au) in Fengshan porphyry Cu-Mo deposit, China

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Nine hand specimen and four flotation concentrates have been analyzed (Table 1).

Sample	Type	Au ppb	Pt ppb	Pd ppb
FS50	intrusive rock	11	0.137	0.165
FS94	altered rock	4	0.234	0.288
FS57	altered rock	10	0.389	3.907
FS4	ore, skarn	1480	0.037	3.095
FS9	ore, skarn	531	0.204	17.979
FS45	ore, skarn	310	0.099	0.403
FS64	ore, skarn	402	0.07	1.314
FS8	ore, porphyry	28	1.765	13.888
FS36	ore, porphyry	220	0.175	6.877
SC	sulfide concentrate	897	15.9	13
CFC	copper flotation concentrate	6070	21.8	32
MFC	molybdenum flotation concentrate	2360	81.4	32
CMFC	copper-molybdenum flotation concentrate	12	1.3	1

The results show that concentrate samples have the highest content of precious metal and almost are 1-2 orders of the magnitude higher than ore samples, while the rock samples are the poorest. Meanwhile, the porphyry ore samples have the higher content of Pd, Pt and Au than in the skarn ore samples. PGE enrichment in porphyry deposits probably requires a mantle source region, liberation of mantle sulfides during partial melting in the source region, and an oxidized melt that effectively prohibits the formation of magmatic sulfides during fractionation.This study clearly demonstrates the potential for further research.