

# PYRITE OXIDATION CHANGES IN BOLIVIAN SULPHIDIC MINE WASTES

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Bolivia was until late 1980's a major producer of tin from poly-metallic vein deposits commonly high in sulphide minerals. The mines were often clustered in districts around favourable volcanic centers. These districts had earlier been large producers of silver from the late 1500's, districts like San Jose-Oruro, Potosi and Huanuni. A large number of tailings and waste rock dumps from the more than 10.000 registered mines in the Altiplano of which many are producing acid drainage due to iron sulphide oxidation.

Although acidity in mine drainage commonly requires most of the attention, the primary sources of toxicity are dissolved trace metals. Elevated levels of metal leaching are associated with acidic drainage because metal solubilities and the rates of sulphide weathering increase under acidic conditions.

The Itos mine is a polymetallic vein deposit within the San Jose mining district, had been mined for silver and tin until 1990, leaving behind large tailings and mine waste heaps. Quite often the pyrite content of the waste exceeds 10 wt.%. Serious ARD effects take place in the mine waste heaps. These processes can be well characterized with the pH 1 and 2 of the seepage water, which forms serious alteration in the waste itself and the neighbouring rocks.

In four consecutive years the pyrite oxidation rate was investigated on the same 7 samples by column test. 5-8 months pauses were left between the column test periods, that allow mimicking the alternation of wet and dry periods, typical for the place. Thus the results give much more information, than the oxidation rate in the individual column test periods, showing the changes by time. This applied method gave good result to characterize the behaviour of the waste in long-term.

Column tests were complemented with mineralogical analyses, such as electron probe microanalysis. The mineralogical and column test analyses show, that the changes of the pyrite oxidation rate spilt the samples into three different groups, one where the oxidation rate decreases, second where it increases with time and the third where oxidation rate is maximal and stays stable for several years.

**Presented at the Norwegian Geological Winter meeting, January 7-10, 2013**