

AS AND SB MOBILITY IN THE SB(AU) KOLÁRSKY VRCH DEPOSIT

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The pyrite and Sb-Au deposit Kolársky vrch is situated in a territory of protected nature reserve Malé Karpaty Mts., near Pezinok town (48°18' n. lat. and 17°17' e. long.), 17 km NE from Bratislava. Ore mineralizations: 1) the metamorphosed pyrite-pyrrhotite exhalation-sedimentary and 2) hydrothermal Sb-As-Au mineralization. Both types are hosted in a large fault zone in weakly folded black shales and phylites. Hydrothermal mineralization occurs in form of short carbonate-sulphidic veinlets and nests where Au-bearing arsenopyrite, pyrite, stibnite, berthierite, kermesite are major minerals. Quartz, carbonates, and sericite are gangue minerals. The most intensive exploitation of stibnite started in 1940, mining activities terminated in May 1992. In 1906 the tailings impoundment was constructed, where cca 380 000 m³ of fine-grained waste was deposited.

The objectives of the study are: 1) to characterise nature and chemistry of water from mines and tailings impoundment at the Kolársky vrch deposit, 2) identification and characterization of oxidation products of ore minerals, particularly of the young ochres deposited from the mine-drainage, which play important role in transport and attenuation of Fe, As, Sb, sulphates, and trace elements. Increased contents and accumulation of such precipitates was recorded in several areas: flooded zone along the south-eastern dam of tailings impoundment and in mine drainage water from Budúcnosť adit (Hrubá dolina valley), Sirková and Ferdinand-Karol adit (1 km SE of Kolársky deposit).

Highest concentrations of toxic elements are in the drainage water of the tailing impoundment. The As concentration varies significantly between the samples from X ppb to X ppm. Contents of Sb highly exceeds the limits for drinking water (locally 100x, STN 75 7111) in all investigated seepages. Frequent precipitation of gypsum from these waters indicates also high contents of sulphates.

Chemical composition of ochres, precipitating on the deposit in neutral to basic environment (pH 6,45-8,35) reflects the provenience and composition of water. Secondary phases from the tailing seepages exhibit highest contents of As, Sb and sulphates, whereas in the ochres from adits (Budúcnosť, Sirková, Ferdinand) they occur in trace amounts. Their common feature is presence of very tiny particles of Fe-oxyhydroxides. The aim of present study is detailed characterization and identification of these phases by means of X-ray diffraction, infrared spectroscopy, differential thermal and thermogravimetric analyses, transmission electron microscopy, methods of selective dissolution and colour measurement.

The presence of secondary sulphates halotrichite and copiapite as weathering products of ore-bearing rocks was recorded in the 2002. These minerals form crusts on the walls of Sb-ore open pit Kolársky vrch.

Results of present study document intensive weathering and migration of dissolved species on the abandoned Sb(Au) deposit Kolársky vrch.