EPITHERMAL Au-Ag MINERALIZATION IN PUKANEC (CENTRAL SLOVAKIAN NEOGENE VOLCANIC FIELD)

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The Pukanec ore district is situated in the SW part of Banská Štiavnica strato-volcano. The beginnings of mining activity date back in the 11th century. The maximum of exploitation was in the 15th and the 16th centuries and real end of mining was in the last century. Large ancient remnants after gold mining indicate the intensity of historical mining.

Four geological units are distinguished at Pukanec: prevolcanic sedimentary complex, complex of andesite porphyries, Tatiar intrusive complex (granodiorite, quartzdiorite and diorite porphyry) and intrusions of rhyolites and their porphyries. In this environment occur two genetic types of epithermal mineralizations: an older porphyry Cu mineralization and an overprinted, intrusion related base metal stockwork mineralization stage (high sulfidation) with a younger gold–silver vein stage (low sulfidation), which was the main object of mining in the past (ŠTOHL *et al.*, 1994).

Geological and mineralogical research in outcrops and old mines demonstrated that the main objects of exploitation were black coloured fillings of cataclased zones amidst altered (silicified) andesites. Auriferous zones (max. 1 m thick) are formed by clay minerals, fragments of vuggy quartz and fragments of silicified andesites. Black colour is due to Mn oxides and hydroxides. Sometimes quartz–carbonate veins are present without ore mineralization. Au-Ag content in mineralized zones is 5–25 ppm. In the black coloured clay zones occur gold (Ag 35–43 wt%), oxidized pyrite, Mn oxides and hydroxides, clay minerals and rare grains of stibnite. The size of gold grains (wire and skeletal form, flakes) is max. 0.2 mm. Black cataclased auriferous zones have a depth range of about 30 m. Wallrock alterations are sericitization, adularitization and silicification.

Primary gold mineralization was found at the depth 142–145 m (drill hole). Texture of mineralization is brecciated where argillitized (pyritized) andesites are cemented by quartz. Gold occurs in wire and flake forms (max. 1 mm) in the quartz druses. Their red-brown colour is due to Fe oxides. Wallrock alterations are argillitization and silicification.

Alluvial gold (Ag 32–50 wt%) occur in almost all brooks in the Pukanec area. Gold grains are very diverse in morphology (skeletal form, wire aggregates, slightly rounded aggregates of crystals, flakes). Surface of gold grains is smooth or spongy. Size of grains is variable (0.0x–2 mm). During a longer transport (about 3 km) in alluvium Ag is leached out from the Au-Ag alloy and an Au rich rim is formed.

References

ŠTOHL, J., LEXA, J., KALIČIAK, M. & BACSÓ, Z., (1994). Min. Slov., 26: 75–118.