SULPHOSALTS FROM CHYŽNÉ-HERICHOVÁ IN THE WESTERN CARPATHIANS (SLOVAKIA)

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Herichová occurrence is found ~ 3 km NNE from the village of Chyžné (County Revúca) in Central Slovakia. The locality is situated in the western part of the Spišsko-gemerské rudohorie Mts. near the contact zone of two significant tectonic units of the Western Carpathians – Gemericum and Veporicum Unit. The host rocks of the hydrothermal mineralization is granite of Rimavica type and Carboniferous metamorphosed fine-grained sandstones cyclically alternating with phyllite schists of the Slatvina formation.

We described the following mineral assemblages: 1) arsenopyrite–pyrite (with arsenopyrite, pyrite, sphalerite, hübnerite, quartz); 2) stibnite (stibnite, jamesonite, zinkenite, berthierite, chalcostibite, tetrahedrite, kermesite, andorite I, robinsonite, chalcopyrite, sphalerite, quartz); 3) carbonate (rhodochrosite, calcite, kutnohorite); 4) Galena (galena, bismuthinite, native bismuth, heyrovskýite, lillianite, gustavite, joséite-A, joséite-B, baksanite, andorite II, quartz). The hypergene stage is represented by secondary minerals: cerussite, anglesite, gypsum, senarmontite, stibiconite (?), valentinite (?), scorodite and oxides of Mn, Fe and Sb.

Sulphosalts are mainly represented by Pb-Sb, Ag-Pb-Sb and Ag-Pb-Bi phases (groups).

From the group of Pb-Sb sulphosalts jamesonite is most common. Jamesonite show a stable chemical composition, sometimes with increased content of Cu (up to 0.16 *apfu*), Ag (up to 0.04 *apfu*) and Bi (up to 0.03 *apfu*). Zinkenite frequently forms euhedral needle crystals enclosed by tetrahedrite, antimonite and jamesonite or by idiomorphic crystals of sphalerite. Zinkenite has sometimes an increased content of Zn (0.68 wt%, 0.62 *apfu*) and/or Bi (0.88 wt%, 0.25 *apfu*). Robinsonite sporadically contains up to 0.02 *apfu* Bi. All the Pb-Sb sulphosalts contain 0.01–0.05 *apfu* Cd and 0.01–0.09 *apfu* Cl.

Ag-Pb-Bi sulphosalts are represented by lillianite homologues $N = 4$ (gustavite and lillianite) and $N = 7$ (heyrovskýite). According to their chemical composition all the Ag-Pb-Bi sulphosalts are markedly enriched the Ag-Bi end-member. Content of the Ag-Bi end-member in lillianite reaches 54.11–73.45 mol% range, in heyrovskýite 46.58–64.21 mol% range and in gustavite 79.57 to 93.86 mol% range, which is almost the Ag-Bi end-member of the lillianite–gustavite series. Lillianite and heyrovskýite have an increased content of Sb (up to 0.09 *apfu*) and Cd (up to 0.16 *apfu*). An increased concentration of Sb (up to 0.08 *apfu*) and Cd (up to 2.07 *apfu*) was detected in gustavite, too.

Ag-Pb-Sb sulphosalts are represented by the analogues of the lillianite homologous series ($N = 4$). Two types of andorite occur on the locality. The first type of andorite forms tiny needles and inclusions in stibnite together with robinsonite and jamesonite. It contains 97.76–101.38% molecule of andorite and according to MOËLO *et al*. (1989) it is senandorite (andorite VI). This andorite have an increased content of Cu (up to 0.22 *apfu*), Fe (up to 0.02 *apfu*), Cd (up to 0.02 *apfu*) and sometimes Bi (up to 0.01 *apfu*), too. The second type of Ag-Pb-Sb sulphosalts (andorite?) occurs associated with Bi-Pb-Ag sulphosalts, native bismuth, bismuthinite and Bi-Te minerals in galena. These sulphosalts contain 77.81–81.79% andorite molecule and can be grouped between ramdohrite and an unnamed member of the series "81.25", with the theoretical formula of $Pb_{22}Ag_{13}Sb_{45}S_{96}$. These sulphosalts have an increased content of Cd (up to 0.09 *apfu*) and especially Bi (up to 1.38 *apfu*).

Tetrahedrite frequently forms idiomorphic to allotriomorphic crystals in the quartz. We described two types of tetrahedrite. The first type forms isolate grains in quartz and it can be characterised by an increased content of Hg (up to 0.03 *apfu),* Cu (up to 9.77 *apfu*) and a decreased content of Ag (up to 1.38 *apfu*) as compared to the second type of tetrahedrite. The second type occurs together with zinkenite, jamesonite and sphalerite. Both types of tetrahedrite have an increased content of Cd (up to 0.03 *apfu*) and sometimes As (up to 0.32 *apfu*).

Bi-Te minerals occurs together with native bismuth, bismuthinite and Ag-Pb-Bi(-Sb) sulphosalts in galena. We identified joséite-A, joséite-B and baksanite. In these tellurides the content of Se is very low. On the average joséite-A and joséite-B contain about 0.16 *apfu* Pb and baksanite 0.34 *apfu* Pb. Content of tellurium varies at from 1.23 *apfu* to 1.36 *apfu* for joséite-A, from 1.49 *apfu* to 1.54 *apfu* for joséite-B and from 1.82 *apfu* to 2.02 *apfu* for baksanite. The average empirical crystal chemical formula of the tellurides is as follow: baksanite $(Bi_{5.66}Sb_{0.01})_{5.67}(Pb_{0.34}Cu_{0.01})_{0.35}Te_{1.92}Se_{0.01}S_{3.0}5$, joséite-A $(Bi_{4.11}Sb_{0.01})_{4.12}Pb_{0.16}Te_{1.29}S_{1.41}$ and joséite-B $(Bi_{3.97}Sb_{0.01})_{3.98}Pb_{0.16}Te_{1.55}Se_{0.02}S_{1.30}$.

Reference

MOËLO, Y., MAKOVICKY, E. & KARUP-MØLLER, S. (1989): Sulfures complexes plombo-argentifères: minéralogie et cristallochimie de la série andorite-fizelyite $(Pb,Mn,Fe,Cd,Sn)_{3-2x}(Ag,Cu)_x(Sb,Bi,As)_{2+x}(S,Se)_6$. Documents du BRGM, 167, Orléans: BRGM, 107 p.