

**COLORADOITE FROM THE SILICIFICATION ZONES
OF THE UCHASTOK KRUTOY GOLD OCCURRENCE, PAY-KHOY, RUSSIA**

Приводятся данные о колорадоите, который был впервые установлен (на основе электронно-микроскопических исследований) в областях окварцевания и кварцевых прожилках низко- среднетемпературного гидротермального рудопроявления «участок Крутой» в пределах хенгурского габбро-долеритового комплекса Пай-Хоя.

The Uchastok Krutoy ore occurrence is located in the central part of the Hengur [Zaborin, 1972] (Central Pay-Khoy [Ostaschenko, 1979; Yushkin et al., 1972]) complex, on the right bank of the Hengur-Yu River, 500 m southeast of the Krutoy stream mouth. It was distinguished in 1969 during the geological exploration of the Nyalpey geological party [Zhukov et al., 1969]. The occurrence represents a NW-elongated bedded gabbro-dolerite body concordant to the Middle Ordovician clay shales. The length of the deposits is about 1.5 km, in a plan the body is characterized by number of swells and pinches, so its visible thickness ranges from 60 to 200 m. The intrusion dips to the southeast at an angle of 60–70° and have a zonal structure. Its periphery is composed of crystalline pale-greenish-gray glomerogranular dolerites, which, toward to the central part, transits into the porphyry varieties replaced by coarse-grained quartz-amphibole gabbro-dolerites. The latter rocks are spatially and genetically related to a zone of evenly disseminated (1–2 mm) magmatic chalcopyrite-pyrite-pyrrhotite mineralization formed at the final stages of intrusion crystallization.

The vermiform sulfide ingrowths are associated with interstitial quartz-albite myrmekite aggregates between randomly distributed prismatic grains of plagioclase and, locally, form a discontinuous margin along their boundaries. An accessory apatite is often intergrown with sulfides; tourmaline and zircon are rare. The amount of sulfide varies from 5 to 20 vol % (7–10%, on average). Chalcopyrite is extremely rare (less than 0.5–1.0 vol %) and is locally associated with quartz in the thin cross-cutting veins.

As a result of mining activities, ore zone 2–20 m wide has been traced for 1.2 km by trenches at a distance from each other of about 80–120 m [Zhukov et al., 1969].

Previously, gold-telluride mineralization in the gabbro-dolerite bodies of the Hengur complex of the Pay-Khoy was observed only at the Pervyi and Savabey areas as a part of copper-nickel sulfide ores (Shaybekov, 2011). The Te mineralization has not been found yet at the Uchastok Krutoy occurrence [Yushkin et al., 2007] and its first description is given below.

Coloradoite as isometric inclusions up to 1 μm in size was found in a close assemblage with chalcopyrite for the first time in the Pay-Khoy (Fig.). The composition of mineral is significantly distinct from the stoichiometry that is related to the admixtures of Ag (up to 25.35 wt %), Ni (up to 2.06 wt %), and Pb (up to 17.96 wt %) (Table). The Ag and Ni admixtures may be related to the specific regional mineralogy (copper-nickel ores, quartz veins and areas of silicification of mafic rocks, etc.).

The quartz veinlets also contains chalcopyrite, $\text{Cu}_{0.88}\text{Fe}_{1.00}\text{S}_2$, grains 1–4 mm to 2 cm in size, covellite, $(\text{Cu}_{0.64}\text{Fe}_{0.06})_{0.7}\text{S}$, grains 20–100 μm in size often replaced by native silver, rare wurtzite grain up to 1 mm in size associated with gold, and Ag-bearing (up to 17.60 wt %) gold 0.1–0.5 μm in size. Angular grains of native lead up to 1.5 μm in size (Sn up to 14.50 wt %) and native tin up to 3 μm in size are found in the cataclastic areas.

Table

Chemical composition of coloradoite (wt %)

Elements, wt%					Total	Formula
Ni	Ag	Te	Hg	Pb		
1.59	5.22	31.42	45.87	13.88	97.97	$\text{Hg}_{0.92}\text{Pb}_{0.27}\text{Ag}_{0.19}\text{Te}$
n/d	19.46	33.23	46.67	n/d	99.36	$\text{Hg}_{0.89}\text{Ag}_{0.69}\text{Te}$

n/d – not detected.

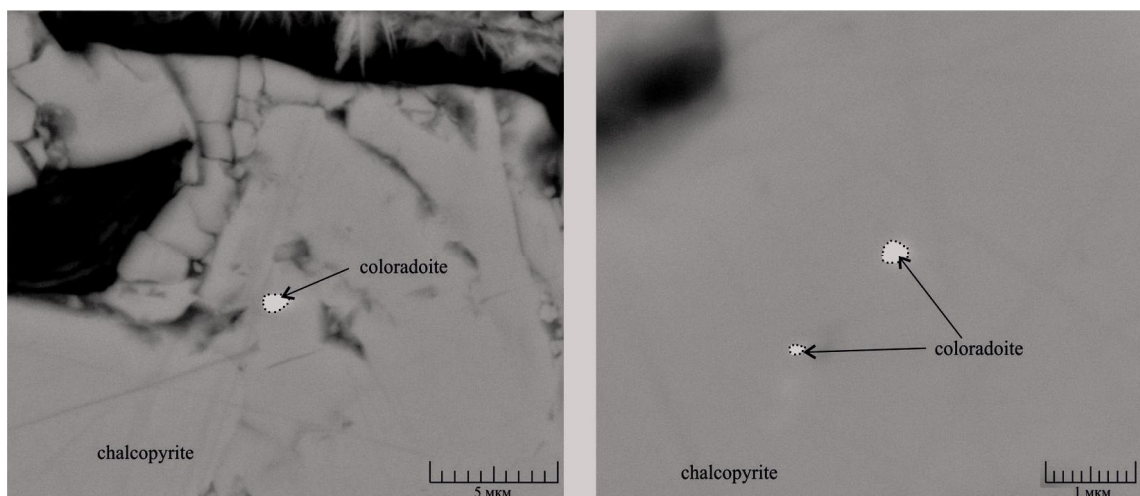


Fig. SEM image of coloradoite in chalcopyrite.

Thus, the chemical composition of coloradoite reflects the specific formation conditions under low- and medium-hydrothermal process in the quartz-chalcopyrite veinlets.

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FORMATION CONDITIONS AND DYNAMIC OF THE DEVELOPMENT OF THE OROGENIC ORE-FORMING SYSTEM OF THE KUMTOR GOLD DEPOSIT, CENTRAL TIEN SHAN

Месторождение Кумтор является одним из крупных золоторудных объектов Тянь-Шаня. Рудные зоны локализованы в породах черносланцевой формации в амагматичной пологозалегающей структуре. Отличительными особенностями месторождения в ряду золоторудных объектов, локализованных в черносланцевых толщах, являются преобладание руд пирит-(полевошпат)-карбонатного состава и практическое отсутствие в рудах мышьяка. Месторождение Кумтор – типичный представитель месторождений орогенного типа.