

Gold and PGE minerals from the northern Urals and Pay-Khoy

S. K. KUZNETSOV, T. P. MAYOROVA, N. V. SOKERINA
AND R. I. SHAYBEKOV

Institute of Geology Komi SC UB RAS
sokerina@geo.komisc.ru

The Subpolar Urals contain gold-palladium occurrences localized in Late Riphean-Vendian rhyolites and overlying Late Cambrian-Early Ordovician quartz gritstones and conglomerates. Gold occurs predominantly in thin fuchsite veinlets with thickness less than 1-1.5 cm. Apart from fuchsite veinlets include allanite, albite, quartz, hematite, titanite, anatase, leucosene, xenotime, monazite. Sulphides are virtually absent. Single grains of silver, Zn-chromite, chalcopyrite, molybdenite, acanthite, pyrrargyrite, rare earth minerals etc occur in the veins. Gold is found in close association with mertieite, atheneite, native palladium, sperrylite, stibiopalladinite, native platinum, stillwaterite (?). Gold is mostly fine – up to 50 microns, although the size of the individual gold grains reaches 8 mm. Gold contains impurities of Ag (sometimes up to 50 wt.%), Cu (up to 11 wt.%), Hg (up to 1.3 wt. %) and Pd (up to 1.7 wt. %). Gold occurs to have complex internal structure, resembling the breakdown structure of a solid solution. Gold tends to include number of lamellas with thickness of 1-2 microns that have higher content of Cu than the matrix. The gold fineness is about 850-906‰.

Gold-platinum-palladium occurrence of the Polar Urals is located in ultramafic rocks the northern part of Voykar-Synya massif. Noble metal minerals are in close association with copper sulfides and form very fine grains. First of all they are presented by gold-copper phases of cuproauride-auricupride range. There detected gold-palladium copper, golden silver, kustelite, mertieite, merenskeite, maychenerite, braggite, sperrylite, palladarsenite, atheneite, sobolevskite and other mineral phases. Discoveries of gold and platinum-palladium minerals in chrome ores of Voykar-Synya and other ultramafic massifs are well-known. In particular, sobolevskite Pd(Bi,As), potarite PdHg, zvyagintsevite Pd₃Pb,(Pd,Hg)₃Pb, plyumbopalladinit are found in the form of tiny inclusions in millerite.

Gold-PGE mineralization in Pay-Khoy is associated with zones of copper-nickel mineralization localized in the Upper Devonian gabbro-dolerites. Platinum minerals are presented by sperrylite, platinum-palladium tellurides.

The available data indicate wide development of gold-PGE mineralization in the northern part of Urals and Pay-Khoy. Formation of gold-PGE mineralization is associated with hydrothermal-metasomatic processes occurred predominantly in the Late Paleozoic.

The investigation was carried out with the financial support of the Programs: ARCTIC № 45, RFBR p_north_a №13-05-98819 № p_north_a №13-05-98820, Scientific School 4795.2014.5