Evidence for formation of alluvial diamonds from North-East of Siberian platform in subduction environment

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Diamonds from placers show large variability in nitrogen content ranging from below detection to 3500 at.ppm. Nitrogen contents in diamonds with eclogitic inclusions are generally high (average of 950 at.ppm) as compared with diamonds of ultramafic suite (average of 513 at.ppm). $\delta^{13}C$ values of the diamonds range from -27 to - 3‰ (n=28) for eclogitic diamonds and from -7.1 to -0.5‰ (n=16) for peridotitic diamonds. The 265 diamonds were polished to expose their mineral inclusions. Inclusions of eclogite suite are predominant (74%). The diamonds of the eclogitic suite contain garnet, omphacitic clinopyroxene, coesite, K-feldspar, rutile, corundum. The peridotitic diamonds contain olivine, Cr-pyrope garnet, ortopyroxene and chromite. Majoritic garnets of both peridotitic and eclogitic parageneses were identified in 4 diamonds. The olivines have Fo contents between 89.7 and 93.8 mol.% (average – 92.4). Eclogitic garnet and Cpx inclusions are within the range of eclogitic inclusions of wordwide. For an assumed pressure of 5 GPa eclogitic garnet and clinopyroxene gave temperatures in the range 1028-1290ºC. The majority of eclogitic diamond show positive Eu-anomalies. High-Ca group garnets are LREE depleted, show strong positive Eu (up to 4.25) and Sr anomalies and have HREE contents that are less than the low- and intermediate-Ca group samples. Eclogitic Cpx inclusions are characterized by convex REE_N patterns with maxima at Nd or Sm. The presence of majorite inclusions indicate that the portion of the diamonds is of sublithospheric origin. Multiple inclusions from diamond and their carbon isotopes composition are consistent with a mixing model in which they result from the interaction of slab-derived melt/fluid with surrounding mantle. The nature of the variations in the carbon isotope composition and the nitrogen contents indicate that the diamonds growth medium have at least two sources (mantle and recycled earth crust via subduction zone). Mantle carbon was involved in the diamond formation process during the final stages of growth.

Telluride-gold-sulfide mineralization in silicification zones of gabbro-dolerite bodyes of hengursk complex (Russia, Pay-Khoy)

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According to the previous studies gold-telluride mineralization has been found only in the gabbro-dolerite bodies of Pay-Khoy hengursk complex at the districts "Pervyi" and "Savabeysky" in copper and nickel ores [1]. The studies of sulfide (chalcopyrite highly) mineralization in quartz veins of district "Krutoy" revealed silver-gold-telluride phases with later hydrothermal origin.

Telluride-gold-sulphide mineralization is characterized by a fairly stable composition - chalcopyrite, covellite, wurtzite, gold, silver, coloradoite (found for the first time in Pay-Khoy) and native phase. The composition of coloradoite has minor changes from the classic mineral which could be explained by the specificity of mineral formation or inaccurate analysis due to the small size of the grains. The impurities of silver and lead in insignificant quantities were found, which allowed distinguishing of two kinds - silver-lead and silver. The formation of this type of mineralization occurred in a low-, medium-temperature hydrothermal process in the veins of gold-bearing sulphide mineralization.

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[1] Shaybekov R.I. Mineral assemblages and genesis of platinum sulphide mineralization in gabbro-dolerite Pay-Khoy (Russia, the Nenets Autonomous District) // Notes RMS, 2011. № 6, pp. 70–86.

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