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P.O. Box 97711, T.S.T. Kowloon, Hong Kong.
Tel/Fax: (852) 2366 6006

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Corundums and Marundites of the Sutara Deposit (The Russian Far East)

Pakhomova V.A., Buravleva S.Yu., Kurnosov A.L., Zalishchak B.L., Tishkina V.B., Fedoseev D.G., Zharchenko S.Yu., Mouzhevsky D.A., Ushkova M.A.

俄羅斯之Sutara沈積礦除曾發現有黃金砂礦外，亦在其發現錫石礦、灰色剛玉等。其中發現之剛玉塊件重量有達15至20公斤。

The earliest discovery of corundum in the Sutara golden mine district, which is situated in the Yevreyskaya Autonomous District (of the Russian Far East) (Fig .1) was actually made as a result of gold mining. In 1943, during site exploration for cassiterite in gold-bearing placers, geologists (1) discovered the presence of gray corundum fragments in the alluvium of the Perekhodnaya River. Later, in the vicinity of the mining settlement, large, sometimes well formed blocks of corundum reaching weights of 15-20 kg were discovered. So the corundum was worked with the gold. About 2 tons of corundum ore were mined with a 70-80% corundum content.

Fig. 1 Sutara gold mining district

At present, there are 4 sources of corundum in the Sutara mining district, two of which (Kurortnoe and Pervomaiskoe) occur in carbonaceous rocks and in the veins of intruding granites. The others (Sutarskoe and Petrovskoe) occur in terrigenous-carbonaceous rocks ruptured by granite intrusion. Carbonaceous rocks alter on contact with granites, becoming marble. Granite veins are sometimes desilicated and turn into plagioclasite. Corundum mineralisation is associated with skarns and plagioclasites.

In 2009, the authors carried out fieldwork searching for gem quality corundum in the basin of the Sutara River. At the outer limits of the Sutara area, at the Petrovsko-Afanasyevsky site, marundite samples were discovered, and then, in the basin of the streams of the Petrovsky and Mikhaylo-Afanasyevsky, corundum crystals and their fragments.

Corundum mineralisation is confined to the carbonaceous rocks and crystalline schist intruded by alaskitic granites. Carbonaceous rocks in contact with granite are metasomatically altered to ophicalcite and serpentine as a result of contact metamorphism. Pegmatite veins, which are developed in the contact zone of granites with carbonaceous rocks, bear corundum mineralisation. By their structural peculiarities, rocks covering pegmatite veins are transitional between medium-grained pegmatites and aplites. There is no particular zonality in the vein structure. Corundum rocks – marundites (Fig. 2) – are represented by almost monomineral varieties with small amounts of colourless, brittle mica filling the gaps between the corundum crystals. The crystals of corundum may be light gray, gray, and dark gray. They are coarse-grained and elongated, reaching up to 5-6 cm in length, and up to 2 cm in thickness.

Fig. 2 Corundum rock - marundite

Marundites contain, mainly, corundum, margarite, and phlogopite (Fig. 3).

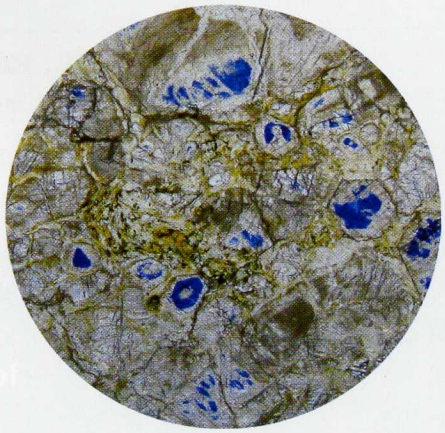

Fig. 3 Marundites contain corundum, margarite, and phlogopite

Accessory minerals are represented by apatite, rutile, tourmaline, ilmenite, biotite, muscovite, garnet, and sillimanite. Among secondary ones, there are diaspore and chlorine. Corundum is present at 70-90% and is represented by finely formed, dipyramidal and rhombohedral crystals typical for marundites and corundum plagioclasites.

Corundums from the placers are represented by angular crystals of tabular appearance of up to 50 mm size and their fragments. Almost all of these crystals are characterised by polysynthetic twinning observed with a microscope. They are violetish-blue, grayish-blue, blue, and purple in colour, with the tint varying from very light to dark. (Fig. 4) Some stones demonstrate strong pleochroism. Sample corundums varied in clarity from transparent to translucent, and also opaque. Painting is often zonal and spotty. Thin sections cut parallel to the pinacoid demonstrate growth zonality; alternation of differently coloured bands with sharp borders mirroring crystal facets.

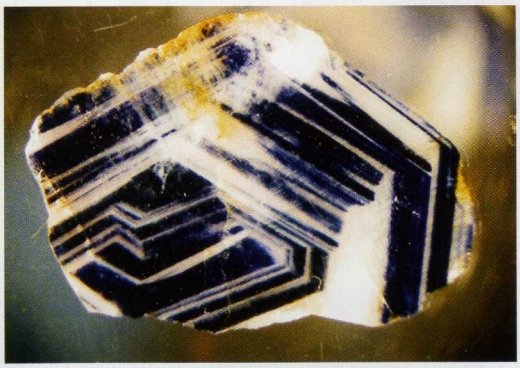

Fig. 4 Corundum of the Sutara Deposit

We established the presence of outcrops of corundum rocks in pegmatite veins of granite composition cutting ophicalcite. This type of corundum mineralisation is the result of the desilication of granite pegmatites during intrusion in the metamorphosed carbonaceous rocks. It has no equivalent in Russia. Corundum-bearing rocks are typically confined to the dikes and veins of the corundum syenites and syenite-pegmatites in the alkali syenites or granite gneisses and gneisses at their contact with massifs of alkali or nepheline syenites. Such are the deposits of the Il'mensky and Vishnevy Mountains in Russia, those in the Provinces of Ontario and Quebec in Canada, Madras and Kashmir in India and Sri Lanka. Metamorphic muscovite-sillimanite-corundum and kyanite-corundum rocks in gneisses and crystalline shale are known in the Ukraine, Yakutia (the Chainyt deposit), India and other regions.

The fact that corundum mineralisation is confined to pegmatite veins of granite composition cutting carbonaceous rocks opens further prospects of finding analogous corundum occurrences in the Maliy Khingnan Mountains (Xiao Hinggan Ling), where pegmatite veins, carbonaceous rocks and products of their metamorphisation are widely presented.

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References:

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