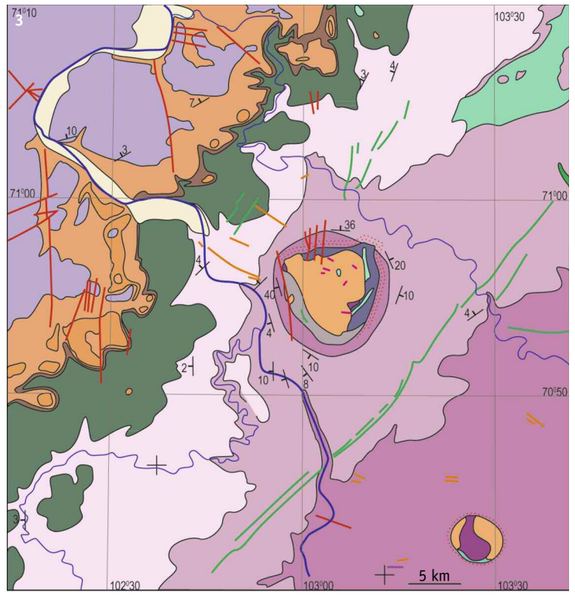
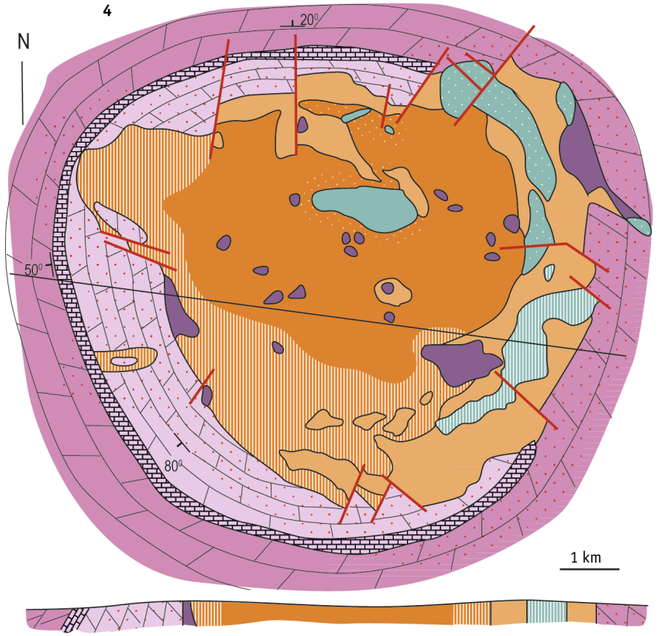
3. Geological map of the Western Anabar Region on a scale of 1 : 200000 (State geological map of the USSR, compiled by V.P. Safronov, Arctic Research Institute, 1965, simplified).
Legend:

– Quaternary alluvium.
– Triassic Aryndzhang sequence. Alkali basaltoid flows, basaltoid tuffite and tuff.
– Permian sandstones, mudstones, coal, and alkali basaltoid flows.
– Upper Devonian limestones and dolomites.
– Ordovician red and green dolomites and dolomite marls.
– Upper Cambrian dolomites.
– Middle to Upper Cambrian dolomites and limestones.
– Middle Cambrian Amga stage, dolomites and limestones.
– Sina Complex. Dolomite and cherts.
– Carbonatite veins.
– Alkaline and alkaline-utramafic rocks.
– Melilite rocks.
– Nephelinized pyroxenite.
– Olivinite.
– Early Triassic picrite and micaceous picrate.
– Dolerite, gabbro-dolerite, and their dikes.
– Alkaline-ultramafic and alkaline rocks: dark-colored dolerite, limburgite, augitite, and their dikes.
– Aureoles of contact metamorphism.
– Tectonic contacts.
– Horizontal and inclined bedding.



4. Geological sketch map of the Odikhincha Pluton, after Egorov (1991).
Legend:

– Ijolite-melteigite,
– jacupirangite,
– melilite rocks,
– olivinite,
– Middle Cambrian dolomite,
– Lower Cambrian limestone,
– Proterozoic dolomite,
– aureoles of contact interaction,
– faults;
– bedding.



UNIQUE CRYSTALS OF MORIMOTOITE FROM PEGMATITE OF THE ODIKHINCHA ALKALINE PLUTON, SIBERIA, RUSSIA

Yulia D. Gritsenko
Geological Faculty, Moscow State University and Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia, Ygritsenko@rambler.ru
Ekaterina I. Gerasimova
Vernadsky State Geological Museum and Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, Moscow, Russia

1. Geographical location of the Odikhincha Pluton, Taymyr district, Krasnoyarsk Krai, Eastern-Siberian Region, Russia.

All specimens: Odikhincha Pluton, Maimecha and Kotui Rivers Basin, Taymyr (Dolgano-Nenetskiy) District, Krasnoyarsk Krai, Eastern-Siberian Region, Russia.

Unique in size and quality crystals of rare Ti garnet morimotoite were found in the Odikhincha Pluton, Northern Siberia, Russia during joint fieldwork of the Fersman Mineralogical Museum, Russian Academy of Science and Geological Club "Geocompany" of Moscow school 179 in 2014 and 2015. They were found within garnet-nepheline pegmatite veins with diopside, pectolite, melilite, phlogopite, sodalite, and fluorapatite. The garnet crystals reaching 25 cm across are frequently zoned in chemical composition. According to our study, the majority of the largest crystals is specifically morimotoite.

The Odikhincha Pluton is situated in the Northern Siberia above Arctic Circle in the Taymyr (Dolgano-Nenetskiy) district of Krasnoyarsk Krai, 50 km south of settlement Khatanga (*Fig.* 1). Odikhincha located in the Northern Siberian Platform at the margin of the Anabar shield is a member of the Maimecha-Kotui alkaline province. This province combines more than ten alkaline plutons and Odikhincha is the second largest of them. It is clearly seen even on the small-scale maps of Siberia (*Fig.* 3).

2. Stone guards on the Kotuy riversides. Photo: Yulia D. Gritsenko, 2015.

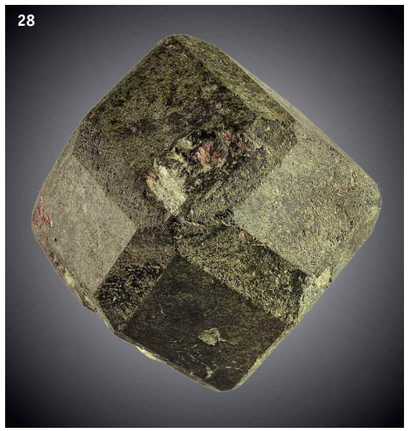
23. Large **morimotoite** crystal (first generation of garnet) epitactically overgrown by Ti-bearing **andradite** (garnet of the second generation) intergrown with **apatite**. 10 cm. Specimen: Geological Club "Geokompaniya" of Moscow school 179, #6-5/2. Photo: Yulia D. Gritsenko, 2014.

24. Radial aggregate of **apatite** with black **andradite** (var. melanite). 8 cm. Specimen: Geological Club "Geokompaniya" of Moscow school 179, #1-3/9. Photo: Michael B. Leybov.

TiO_2 content in the late garnet is lower 8–12 wt. %, i.e., it corresponds to Ti-bearing andradite in the composition. The thickness of these apatite-diopside-andradite zones frequently with nepheline and magnetite reaches 1.5–2 m in some veins. Apatite frequently occurs as spectacular "suns", radial aggregates up to 10 cm in diameter within pitch-black malanite (*Fig.* 24).

Some veins contain small cavities filled by white calcite and pectolite, in which aggregates of small (1–2 cm) bright and shiny black well-formed crystals of Ti-andradite containing 3–6 wt. % TiO_2 (*Fig.* 25–26) are formed.

The size of apatite crystals in these veins decreases inward; the mineral becomes saccharoidal and the composition of garnet tends to be the andradite end member (TiO_2 content 1.5 wt. %). Here, dark brown garnet occurs as isolated crystals up to 3–5 cm in size in apatite matrix and less frequent clusters of these crystals (*Fig.* 27–28).



25. Crystal cluster of Ti-bearing **andradite**. 12 x 9 cm. Specimen: Geological Club "Geokompaniya" of Moscow school 179, #1-3/7.

26. Black crystal of Ti-bearing **andradite** with faces of rhombododecahedron and tetragonal trisoctahedron. 3.5 cm. Specimen: FMM, #94606.

27. **Andradite** crystals in saccharoidal apatite from the central part of pegmatite body. Specimen: FMM, # 94607. Photo: Yulia D. Gritsenko.

28. Brown crystal of Ti-bearing **andradite** with faces of rhombododecahedron and tetragonal trisoctahedron. 4.5 cm. Specimen: FMM, #94607.

25, 26, and 28 photo: Michael B. Leybov.

25, 26, and 28 specimens from Systematic collection of the Fersman Mineralogical Museum, RAS (FMM)**.**

Garnet compositionally corresponds to Ti-bearing andradite in both cores and margins of diopside-phlogopite-melilite pegmatites. Central parts of these bodies probably contained cavities, which at present are filled by white fine-grained natrolite that hosts garnet. In these veins, the latter is black and forms well-shaped crystals up to 10 cm in size, but their surface is frequently coated by whitish thin film of natrolite that cannot be removed.

Unfortunately, all largest garnet crystals from the Odikhincha pegmatites are strongly fractured due to formation and melting of ice even below 1.5 m below surface. They fall apart being recovered from the pockets. Therefore, gluing of fractures in situ is the only way for their preservation. This is how the largest specimens were recovered.