

MINERALS OF THE LIPOVKA GRANITE PEGMATITES, CENTRAL URALS, RUSSIA

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Three noticeable deposits are mentioned Sarapulka, Shaytanka and Lipovka when famous red tourmaline from Urals is discussed. They all are considered classic mineralogical localities (Pekov, 2006). Lipovka keeps on providing very interesting specimens while glory of Sarapulka and Shaytanka is completely in the past: all outstanding specimens of rubellite-“siberite”, rhodizite that first discovered there, beryl and topaz from these pegmatites are in old mineral collections. According to Kievlenko (2003), Lipovka is the biggest source of gem tourmaline in Russian history. The deposit is also famous for mineral oliversity of gemstone rare-metal pegmatites besides colorful tourmaline.

The Lipovskoye pegmatite field, usually called “*Lipovka*” for short, is located in Rezh district of Sverdlovsk Oblast in Central Urals. It is 70 km to north-northeast from Ekaterinburg city and in 20 km to north-west from town of Rezh. Old village named Lipovskoye is the closest dwelling to the pegmatites, which are as close as 2–4 km to south-west from it. The first and the most famous deposit of tourmaline in Lipovka was Sherlovaya pit. According to Nenadkevich (1911) it was discovered “*in Sporninskiy gully in 2–2.5 km from the village*”. Found later pegmatites are located farther from Lipovskoye in the same direction to south-west on the territory of exhausted Lipovskoye nickel deposit.

“*Minerals from Lipovka are extraordinary various but absolutely not studied and somewhat even not identified*” A.E. Fersman wrote in his classic monograph “*Pegmatites*” in 1940. It is strange and yet true that systematical study of minerals from the pegmatites was not carried out until recent time in spite of the locality fame and number of specimens in private and museum collections. Especially scarce data can be found on chemical composition of minerals including mineral groups that are represented with number of species (micas, tourmalines, niobotantalates). We attempted to systematically study minerals of Lipovka granite pegmatites on old museum material (from Fersman Mineralogical Museum of the Russian Academy of Science (RAS) in Moscow, gathered by V.I. Vorobiev, V.I. and L.I. Kryzhanovskiy, A.E. Fersman and other researchers in early 20 century as well as recently collected (our own collection gathered in 1995–2006, speci-

Location of Lipovka pegmatite field



Table 1. Minerals of Lipovka granite pegmatites

Native elements

Graphite* C

Fluorides

Fluorite? CaF₂

Oxides and hydroxides

Corundum* Al₂O₃

Hematite** Fe₂O₃

Quartz SiO₂

Chrysoberyl BeAl₂O₄

Gahnite⁺ ZnAl₂O₄

Magnetite* FeFe₂O₄

Asbolane** + (Co,Ni)_xMn⁴⁺(OH)₄

Coronadite** + Pb(Mn⁴⁺,Mn²⁺)₈O₁₆

Brucite* Mg(OH)₂

Goethite** FeOOH

Niobium/tantalum oxides

Manganocolumbite MnNb₂O₆

Ferrocolumbite⁺ FeNb₂O₆

Magnesiocolumbite* + MgNb₂O₆

Manganotantalite⁺ MnTa₂O₆

Ferrotantalite⁺ FeTa₂O₆

Magnesiotalantalite* + MgTa₂O₆

Stibiocolumbite SbNbO₄

Stibiotantalite SbTaO₄

Bismutotantalite⁺ BiTaO₄

Microlite (Ca,Na)₂Ta₂O₆(OH,F)

Plumbomicrolite⁺ Pb_{2-x}Ta₂O₆(OH,F)

Bismutomicrolite⁺ Bi_{2-x}Ta₂O₆(OH,F)

Uranmicrolite⁺ U_{2-x}Ta₂O₆(OH,F)

Fersmite* + CaNb₂O₆

Euxenite-(Y)? Y(Nb,Ti)₂O₆

Carbonates

Calcite* CaCO₃

Phosphates

Fluorapatite Ca₅(PO₄)₃F

Cheralite⁺ CaTh(PO₄)₂

Silicates

Phenakite* Be₂SiO₄

Zircon* + ZrSiO₄

Almandine Fe₃Al₂(SiO₄)₃

Spessartine Mn₃Al₂(SiO₄)₃

Topaz Al₂SiO₄F₂

Dumortierite Al₇(SiO₄)₃(BO₃)O₃

Beryl Be₃Al₂Si₆O₁₈

Cordierite* Mg₂Al₄Si₅O₁₈

Schorl NaFe²⁺₃Al₆(Si₆O₁₈)(BO₃)₃(OH)₃(OH,F)

Dravite* NaMg₃Al₆(Si₆O₁₈)(BO₃)₃(OH)₃(OH,F)

Uvite* CaMg₃Al₆(Si₆O₁₈)(BO₃)₃(OH)₃O

Elbaite Na(Li_{1.5}Al_{1.5})Al₆(Si₆O₁₈)(BO₃)₃(OH)₃(OH,F)

Rossmannite⁺ □(LiAl₂)Al₆(Si₆O₁₈)(BO₃)₃(OH)₃(OH,F)

Olenite⁺ NaAl₃Al₆(Si₆O₁₈)(BO₃)₃(O,OH)₄

Anthophyllite* Mg₇Si₈O₂₂(OH)₂

Tremolite? Ca₂Mg₅Si₈O₂₂(OH)₂

Magnesiohornblende* Ca₂(Mg₄Al)(AlSi₇O₂₂)(OH)₂

Phlogopite* KMg₃(AlSi₃O₁₀)(OH)₂

Biotite K(Mg,Fe)₃(AlSi₃O₁₀)(OH)₂

Muscovite KAl₂(AlSi₃O₁₀)(OH)₂

Lepidolite (trilithionite) K(Li_{1.5}Al_{1.5})(AlSi₃O₁₀)F₂

Masutomilite⁺ K(LiAlMn)(AlSi₃O₁₀)F₂

Kaolinite** Al₂Si₂O₅(OH)₄

*Halloysite** ?* Al₂Si₂O₅(OH)₄

Antigorite* Mg₃Si₂O₅(OH)₄

Talc* Mg₃Si₄O₁₀(OH)₂

Clinocllore* (Mg,Al)₆(Si,Al)₄O₁₀(OH)₈

Cookeite LiAl₄(AlSi₃O₁₀)(OH)₈

Montmorillonite** (Na,Ca)_{0.3}(Al,Mg)₂(Si,Al)₄O₁₀(OH)₂·nH₂O

Nonttronite*,** (Na,Ca)_{0.3}Fe³⁺₂(Si,Al)₄O₁₀(OH)₂·nH₂O

Vermiculite*,** (Mg,Fe,Al)₃(Si,Al)₄O₁₀(OH)₂·nH₂O

Petalite LiAlSi₄O₁₀

Orthoclase KAlSi₃O₈

Microcline KAlSi₃O₈

Albite NaAlSi₃O₈

Oligoclase (Na_{0.8}Ca_{0.2})Al_{1.4}Si_{2.6}O₈

Andesine (Na_{0.6}Ca_{0.4})Al_{1.8}Si_{2.2}O₈

Danburite CaB₂Si₂O₈

Pollucite? (Cs,Na)AlSi₂O₆·nH₂O (n < 1)

Harmotome⁺ (Ba_{0.5},K,Na,Ca_{0.5})₅[Al₅Si₁₁O₃₂]·12H₂O

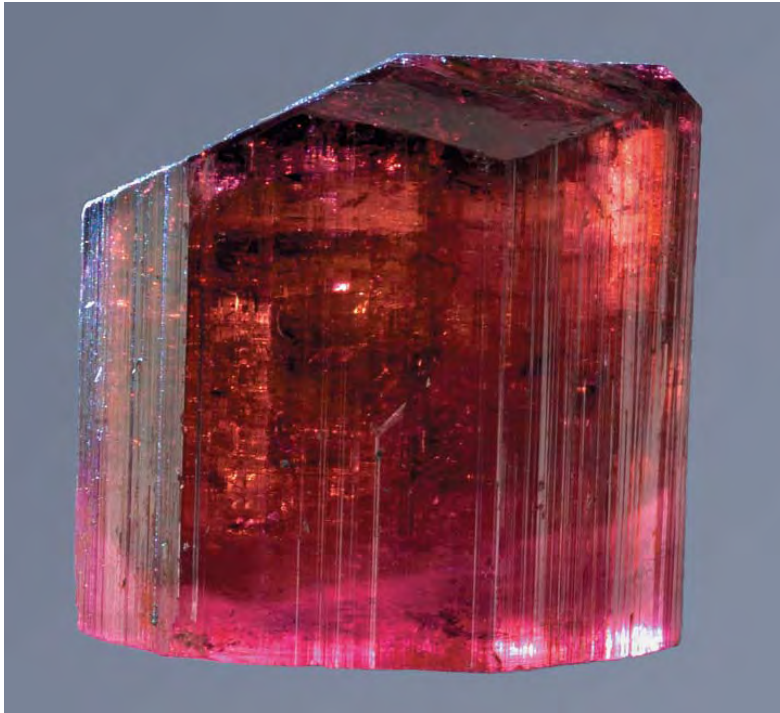
Notes: idealized formulae are given for the majority of the minerals which represent end-members of the isomorphic series.

* – minerals known only in highly desilicified pegmatites or on the contact of pegmatites with serpentinites;

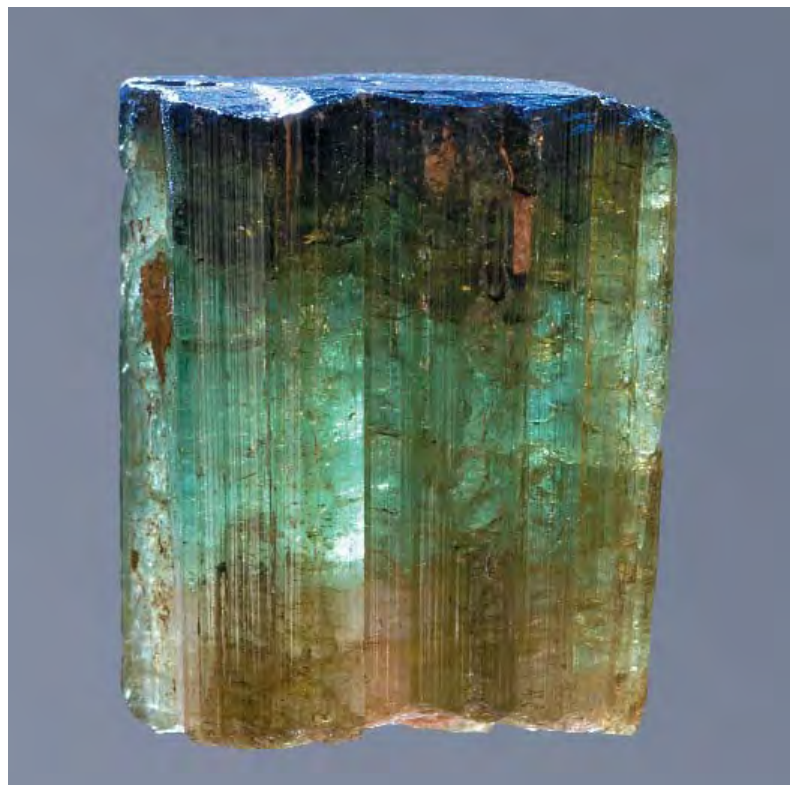
** – supergene minerals;

minerals found in Lipovka which do not have reliable data on them are given in italic and with question mark ?;

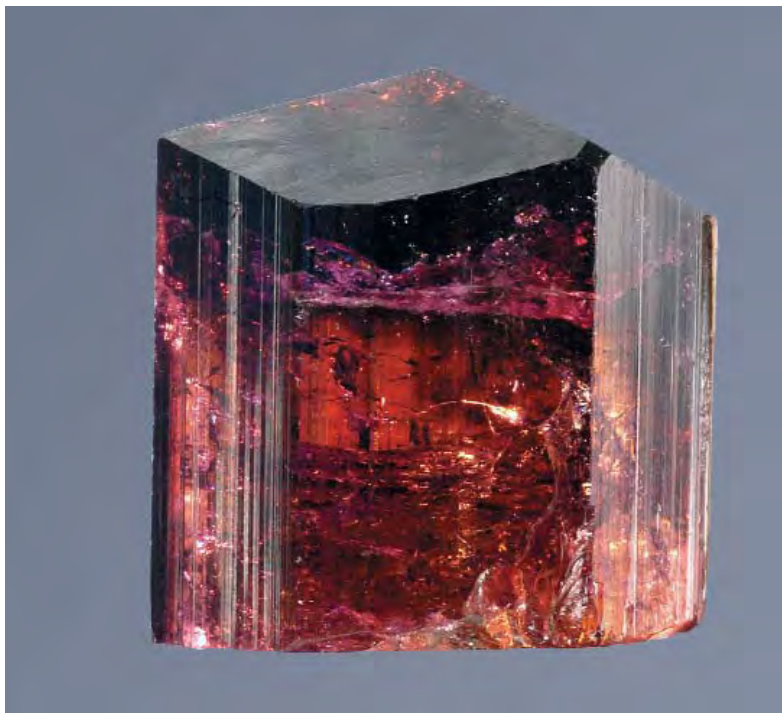
+ – minerals first credibly identified in pegmatites from Lipovka by the authors of the article



Elbaite crystal (1.5 cm). Sherlovaya pit.
Fersman Mineralogical Museum RAS,
specimen #23583.
Photo: Michael B. Leybov



Elbaite crystal (1 cm). Sherlovaya pit.
Fersman Mineralogical Museum RAS,
specimen #23575.
Photo: Michael B. Leybov



Elbaite crystal (1.3 cm). Sherlovaya pit.
Fersman Mineralogical Museum RAS,
specimen #23573.
Photo: Michael B. Leybov



Elbaite crystal (3.5 cm). Sibiryachka vein.
Collected by A.A. Agakhanov, V.Yu. Karpenko
and L.A. Pautov. Photo: Michael B. Leybov