



## Mineralogy of metasomatic rocks and geochronology of the Olhovka porphyry-copper deposit, Chukotka, Russia

Lyuba Rogacheva and Ivan Baksheev

Geological department, MSU, Leninskiye Gory, Moscow, 119899 Russia. (Luba.Rogacheva@gmail.com)

The Olhovka porphyry-copper deposit located on the border of foreland of the Okhotsk-Chukotka volcanic belt (OCVB) and a ledge composed of the Late Jurassic-Early Cretaceous Uda-Murgal arc (J3-K1) rocks is hosted by monzonite stock attributed to the Upper Cretaceous Kavralyan complex - K2)

We estimated age of the Olkhovka monzonite by Rb-Sr and U-Pb methods. Rb-Sr age was determined on the basis of isotopic analysis of 8 monomineralic samples (potassium feldspar, plagioclase, amphibole, and dark mica). Isochron constructed on the basis of Rb-Sr data corresponds to the age of  $78 \pm 2.6$  Ma (MSWD=0.23). The Rb-Sr age is supported by U-Pb data derived from zircon of the same rock. One hundred and three single crystals of zircon were analyzed. Uranium content ranges from 52.66 ppm to 579.64 ppm; U/Th isotopic ratio varies from 0.567 to 1.746; age is  $78.02 \pm 0.65$  Ma (MSWD = 2.8).

Monzonite is propylitized in variable degree. Propylite is composed of actinolite, chlorite, albite, quartz, and calcite. Propylite are cut by quartz-tourmaline veins. In addition, quartz-tourmaline metasomatic rock was identified in rhyolite ignimbrite out of the stock.

Microscopically, tourmaline crystals of both types are oscillatory zoned that is caused by variable Fe content. Tourmalines of both assemblages can be classified as intermediate member of the schorl ("oxy-schorl")-dravite ("oxy-dravite") series. The Fetot/ (Fetot+Mg) varies from 0.31 to 0.95 in propylitic tourmaline and from 0.11 to 0.49, in quartz-tourmaline altered rocks from ignimbrite. Despite similar composition of both tourmalines, the major isomorphic substitutions in them are different. In propylite tourmaline, it is Fe → Al, whereas in the second case, it is Fe → Mg with certain effect of the Fe → Al type. Fe → Al isomorphic substitution is typical of porphyry style deposits (Baksheev et al., 2009 [1]). Therefore, we can conclude that quartz-tourmaline alteration in ignimbrite does not relate to the formation of the deposit.

Chlorite from propylitized monzonite occurs as flakes up to few hundred microns in size. The mineral is associated with muscovite and actinolite. The Fetot/ (Fetot+Mg) ratio ranges from 0.27 to 0.46 that allowing attribution this chlorite to Fe-rich clinocllore.

White mica studied here belongs to muscovite ( 3.04-3.33 apfu Si).

Amphiboles evolved from primary magnesiorhornblende (6.86 apfu Si, 0.48 apfu Na, 1.72 apfu Ca, Mg# 0.71) through early metasomatic actinolite hornblende (7.54 apfu Si, 0.18 apfu Na, 1.81 apfu Ca, Mg# 0.71) to late metasomatic actinolite (7.76 apfu Si, 0.07 apfu Na, 1.74 apfu Ca, Mg# 0.69).

Thus, we obtained first data on age of monzonite stock, which hosts porphyry-copper deposit. Monzonite is of rather young age probably corresponding to the final stage of the OCVB evolution (Tikhomirov et al., 2006 [2]), . Mineralogy and chemical composition of minerals from propylite were studied. In general chemical data are consistent with those from other porphyry-copper deposits.

### References:

- [1] Baksheev I.A, Tikhomirov P.L., Yapaskurt, V.O., Viganina M.F., Prokofev V.Yu. & Ustinov V.I. (2009): Tourmaline of the Mramorny tin cluster, Chukotka Peninsula, Russia. *Canad. Mineral.* 47 (5), 1177-1194.
- [2] P.L. Tikhomirov, V.V. Akinin V.O. Ispolatov P. Aleksandr et al. Age of north part of OCVB: New Ar-Ar and U-Pb geochronology data. (2006) *Stratigrafiya. Geologicheskaya korrelyatsiya*. 14. 5. 81-95 in russian.