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Composition variations of accessory lamprophyllite in Lovozero massif: hidden layering of non-cumulus mineral.

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Composition variations of accessory lamprophyllite in Lovozero massif: hidden layering of non-cumulus mineral. Lovozero massif is a beautiful sample of layered agpaitic intrusion. Rhythmic modal layering is visible in mountainsides and drill-cores. Recently cryptic layering was found in composition of cumulus minerals: loparite (Kogarko et al., 2002), clinopyroxen (Kogarko, Williams, 2005, Zaitsev, Senin 2006) and eudialite (Kogarko, Williams, 2008).

We studied chemical variation of lamprophyllite - a principal accessory mineral of eudialite lujavrites and porthyritic lujavrites of Lovozero massif. Three varieties of compositions discovered in rocks of Lovozero massif: Sr-lamprophyllite, contain <0.2 Ba and $\sim$ 0.08 K(f.u), Ba-Sr lamprophyllite, contain 0.4-0.9 Ba and 0.10-0.20 K (f.u) and baritolamprophyllite, contain 1.4 and more f.u. Ba. Sr lamprophyllite is the most abounded. Sometimes it is corroded by the Ba-lamprophyllite. In crossection of eudialite lugavrite complex Fe content in Sr lamprophyllite increase and Ca content - decrease upward. In porphyritic lujavrites Sr lamprophyllite upward increase Mn content whereas Mg, Ca and Fe content decrease. Ba/Sr ratio does not show any tendency in both cases.

Experimental study of lamprophyllite-nepheline diagram and melting of lamprophyllite group minerals show that paragenesys nepheline + lamprophyllite might exist below 833°C and lamprophyllite fractionation must increase Ba/Sr ratio in melt (Zaitsev et al., 2013). Lamprophyllite composition evolution inside one rock (namely from lamprophyllite to barytolamprophyllite) is in agreement with experimentally founded. From other hand, independence of Ba/Sr ration in lamprophyllite from the vertical position of sample shows that lamrophyllite wasn't cumulative mineral during crystallization of magma of Lovozero massif. From these data, features of lamprophyllite composition variations strictly locate they place in crystallization history as a crystallized from interstitial melt.

Vertical variations of lamprophyllite composition is conform to variations of pyroxene composition: in clinopyroxen of differentiated and eudialite complex Na,Fe and Ti content increase upward and Ca, Mg - decrease (Kogarko Williams, 2005) in porphyritic lujavrites Na, Ti, Mn content increase and Ca, Mn – decrease (Zaitsev, Senin 2006).

These patterns can be explained if we assume that at each level of the lamprophyllite crystallized from melt, equilibrated with pyroxene, formed primarily cumulative matrix of rocks. Thus, the composition of lamprophyllite changes systematically upwards because it inherits patterns composition of primary magmatic clinopyroxene.