

5.4.P12**Cr-bearing mineral phases in carbonatite of Northern Tansbaikalia**

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New location of carbonatites (Veseloe) was revealed in limits of carbonatite-bearing area of Northern Tansbaikalia in 2003. It is located in a frame of Early Precambrian crystal base and is represented by beforite dykes. Comagmatic alkaline silicate rocks were not found in the nearest environment. Carbonatites are massive fine-grained rocks with streakiness conformal to contacts caused by uniform orientation of mineral grains. They are combined by 70-80 % of ferriferous dolomite and 10-20% of apatite. The alkaline amphibole (magnesian riebeckite, potassium inclusive richterite), magnetite, rutile, zircon, fluorophlogopite are also typical minerals. The contents of strontium, titanium, zirconium, nickel, chromium, fluorine and especially phosphorus are higher in carbonatite in comparison with average dolomite carbonatite. The niobium contents are lower. The composition of REE in them is similar to that of carbonatites. Carbonatites have low initial isotope ratio of strontium ($^{87}\text{Sr}/^{86}\text{Sr} - 0,7037-0,7039$), and the composition of carbon and oxygen in dolomite ($-2,2 \text{‰ } \delta^{13}\text{C}$, $8,9 \text{‰ } \delta^{18}\text{O}$ SMOW) is similar to the value typical for carbonatites.

Fine (up to 3-5 mm) resorbed aggregates with Cr-bearing minerals are present in carbonatites. The composition, structural - texture features allow to attribute them to mantle xenolites. They contain high-titanium, Cr-bearing, and in some cases nickel containing minerals. Usually they are aggregate of fine closely accrete magnetite grains (chromium content - 0,8-18 wt. %), rutile (0,3 up to 2,9 wt. % Cr_2O_3), ilmenite and titanite (0,3-0,5 wt. % Cr_2O_3). The most part of Cr-bearing phases represents a mix of intergrowth magnetite and rutile grains. The stoichiometric composition of this mix corresponds to the composition of Cr-bearing ilmenite, appeared to be unstable in environment of carbonatite matrix. Magnetite paragenetic with dolomite and apatite is characterized by increased V-bearing (0,60-1,65 wt. % V_2O_5) and does not contain chromium. Silicate minerals in xenolite are replaced by phengite and chlorite. The Cr_2O_3 content in phengite exceeds 1 wt. %, and in chlorite varies from 1,68 up to 6,15 wt. %. In the letter also 0,65-1,33 wt. % NiO is present. The detection of Cr-bearing inclusions let suggest that carbonatite melt is of mantle source, but not as a result of silicate - carbonate melt differentiation.

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5.4.P13**Genesis of titanomagnetite-ilmenite ores with apatite, Arsenyev massif, Transbaikalia**

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Endogenous titanomagnetite-ilmenite ores with apatite are of interest as objects study of which promotes the solution of a number of petrologic problems. One of them is the identification of character of connection with the alkali-basic and basic complexes of rocks and the way of separation of enriched by phosphorus systems. Arsenyev gabbro-syenite massif is one of the typical representatives of this association detailed study of which allows to understand interrelation of magmatic and ore-formation processes better.

Apatite is often the only mineral in mafic rocks that can yield information about volatile constituents. It is fluorapatite from gabbro and ores of Arsenyev massif. The fluorine contents in ores (1-2 wt.%) is noticeably less than in gabbro (2-3,5 wt.%). Evidently, it is high concentration of fluorine and phosphorus in connection with increased alkalinity of the primary basalt magma that mainly induces liquation, and together with it is ore cluster formation. The content of REE in apatite in gabbro shows usual for basalts character of distribution: relative concentration of lanthanide increases from HREE to LREE, degree of division is medium ($\text{La}/\text{Yb} = 21-36$), europium minimum is distinctly shown. At the same time apatite from ores in comparison with apatite from gabbro does not show europium minimum. The received data are not contrary to liquation of titanomagnetite-ilmenite ores with apatite formation.

The appearance of large anion complexes of trivalent iron ($\text{Fe}_2\text{O}_4^{2-}$) in initial Fe-bearing silicate melt is connected with growth of oxidizing properties of silicate melt at its enrichment by alkaline oxides and water. The predominance of oxidic iron in magnetite demonstrates oxidizing environment. It is likely that the formation of anion complexes $\text{Fe}_2\text{O}_4^{2-}$ instead of cation of bivalent iron in melt predetermines break of miscibility in the system, resulting in liquation of primary homogeneous silicate melt on ore and silicate liquid.

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