The Minerology Evidence for Sulfide Magma bearing Fluids in Talnakh Magmatic Cu-Ni Sulfide Deposit, Russia

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The composition of the "sulfide magma" and the mechanism of the rising and accumulation in the study of magmatic copper-nickel sulfide deposits have always been debated. Recently, all models of magmatic Cu-Ni sulfide deposit cannot explain geological characteristics of the deposit very well. The newly proposed "magmatic conduit metallogenic system" think that there are a lot of fluids in the fluid magma, the density of sulfide magma decrease rapidly, so it is easily rising along the magmatic conduit (Su et al., 2014).

The Ni-Cu-PGE deposit of Noril'sk Region in Russia is one of the most important magmatic sulfide deposits in the world, in which the Talnakh intrusion plays an important part (Li et al., 2009). The ore-bearing olivine norite gabbro from Talnakh Cu- Ni sulfide deposit in Norilsk, Russia was studied in details in this paper. Two types of main rock-forming minerals are identified. The type I plagioclase, mostly albite, is assembled with chalcopyrite, pentlandite, pyrrholite, apatite, amphibolite and anhydrite. It is strongly enriched with LILEs and LREEs, and strongly depleted HFSEs. Type I plagioclase is mainly distributed in the margin of type II plagiclase, It is obviously altered by the fluid. The type II plagioclase, mostly andesine to bytownite, which is enriched in LREEs, and strongly depleted in HFSEs. It is formed by normal crystallization. Type I pyroxene, Type I olvine are enriched in Ba, Sr, they occur the same geochemistry characteristics with Type I plagioclase.

The characteristics of type I minerals show that "sulfide magma" contain a lot of fluids. Sulfide magma should be called sulfide magma-fluid. Overpressur of fluids in the chamber made the sulfide magma-fluid rising along the conduit. This paper provide new evidence for "magmatic conduit metallogenic system".

References

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