



Is assimilation of country rocks in camera of crystallization an important factor for origin of the Noril'sk ores?

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In origin of the unique PGE-Cu Noril'sk deposits a great significance is attached to assimilation of country rocks by mafic melts in camera of crystallization for formation large-scale sulfide ore bodies. The main argument in favor of widespread assimilation is the enrichment of ore sulfides in the heavy sulfur isotope due to the participation of anhydrite from country rocks (Godlevsky, Grinenko, 1963). But real data demonstrated this process are almost absent in literature.

We have studied geochemistry rocks of some sections from surrounding rocks to intrusive ones with sulfide ores. Two of them were done at the Southern Maslovsky deposit located in basalts and one was considered at Talnakh deposit (SW branch) that is situated among carbonate-terrigenous rocks with evaporates (salt, anhydrite, gypsum).

Ores at the Maslovsky deposit are characterized by $\delta^{34}\text{S} = 6\text{--}11\text{\textperthousand}$ while the host basalts of the Nadezhinsky Formation have $\delta^{34}\text{S} < +5\text{\textperthousand}$ (Ripley et al., 2003). Hence, the latter could not be a source of heavy sulfur in sulfides. So basalts of the lower Nadezhinsky subformation at the contact of the Southern Maslovsky intrusion are close to each other in major oxide contents, but basalts are enriched in LREE in comparison with normal REE concentrations in gabbro-dolerite. The La/Sm ratio is characteristic in this respect. At the upper intrusive contact an influence to country basalts on composition of intrusive rocks is not detected at all and revealed in a narrow zone (< 1 m) at the eastern end of the intrusion.

The 50-m sill of the Talnakh intrusion with 11 m of massive ores is located in Devonian rocks. In cross section main, REE, Sr and Nd isotopes were determined. The assimilation of country rocks by magma must be reflected in change of chemical and modal composition of intrusive rocks, especially in contact zones of intrusions, but this effect is not established. Line of component variations have sharp profile from sedimentary rocks to gabbro-dolerites without intermediate values. It shows an absent of contamination in situ.

Data on Nd, Sr, and Pb isotopic compositions of anhydrite from the Devonian rocks demonstrate that the initial $87\text{Sr}/86\text{Sr}$ ratio (0.708637–0.708949, 251 Ma) in anhydrite is lower than in the Nadezhinsky basalt, where this ratio attains 0.709171 (Wooden et al., 1993). The studied samples are characterized by anomalous enrichment in radiogenic lead ($206\text{Pb}/204\text{Pb}$ attains 24.53). It would be expressed in isotopic composition of contaminated igneous rocks, but this is not the case. Thus, anhydrite cannot be a contaminant for igneous rocks and assimilation of country rocks in intrusive chambers was insignificant and thus did not exert an effect on ore formation.