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The magnetic properties of Norilsk type ores

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There are studied the magnetic and structural properties of the ores for purpose of revealing the inclusions, as well as determing their sizes and the forms of Fe, S, Ni, Cu and Co entering them.

The samples have a complex and varied composition, having a wide range of the values of residual magnetization ($0 < I_n \leq 60$A/m). They also have stability to demagnetizing factors. The sample magnetism is caused by the presence of the minerals of sulphide and oxide groups, containing Fe^{2+} and $Fe3^{+}$ as the main components. Magnetization changes irreversibly with the change of temperature. The presence of the step-type thermomagnetic curves indicates the presence of a mechanical mixture, consisting of two and more ferromagnetic phases. It is proved by the discrepancy of Curie temperature in the cycle «heating - cooling». As it was shown by the studies, the presence of the impurity ions leads to changing thermomagnetic properties of pyrites at $t > 350^{\circ}$[U+FFFD]t the expense of high ion Co and S mobility.

There were revealed embedded crystals of $CuFeS_2$ and $(FeNi_9)S_8$ in the pyrrotine matrix and a uniform distribution of Fe on the whole scanned area. However, there are some sections having the size of 30 - 60 μm which are highly enriched with Fe. Some inclusions, having rectangular and diamond forms (2 – 4 μm) contain Ni with increased content of Fe.The concentration of Ni has maximum in inclusions, which contain Cu. The replacement of magnetic ions of Fe with Co ions with nearest values of spin magnetic moment changes the magnetic stability of the samples and Curie temperature.

So, the results of the research testify to the reducing condition of ore formation processes.