The structural properties of Norilsk type ores

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There were text studied the ore structural properties. This was done for the purpose of revealing the distribution of Fe ions and other impure ions distribution. The samples have a complex and varied composition. In the structure of all of the modifications, the values of Fe-Fe and Fe-S depend on the pyrrhotine chemical composition. Depending on the Mossbauer spectra form, there were singled out two sample series.

The first series spectra are the superposition of two six-linear spectra and of single lines of area paramagnetic states. The position of absorption lines in the magnet-ordered areas shows the presence of stoichiometric FeS and $CuFeS_2$. Some of the samples of this series have broadened lines, which testify to the existence of different of iron ions positions in sub lattices.

As regards the other sample series, containing FeS and $CuFeS_2$ in pyrrhotine matrix of $Fe_{1-x}S_x$, the spectra are the superposition of the unsolved doublet, which shows the presence of paramagnetic areas. The magnetic phase has a spectrum composed of two six-linear spectra. The peaks on the spectra boundaries show the oxide presence. The presence of the native elements and the intermetallic compounds testifies to the reducing condition of the ore formation processes.

There were obtained follow results: effective magnetic field (22,8 ÷ 28,3) kA/m; isomer shift (0,300 ÷ 1,394) mm/sec; quadrupole splitting (0,250 ÷ 2,688) mm/sec.

One can see that the given parameters vary over a wide range. It is shows that the local electronic structure depends on the rock origin.

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.

So, the presence of characteristic structures of solid solutions decay shows a wide temperature range for sulphide crystallization.