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The Role of Cation Vacancies in Forming Minerals in the Atmosphere

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There were studied the mechanisms of forming new compounds in the synthesized FexS samples after their synthesizing and keeping in the atmosphere for 29 years. Some of these samples were kept in soldered ampoules. In the soldered ampoules, the pyrrotines having excessive sulphur, as compared with Fe7S8, passed into the stable state. As a result, there was formed the pyrrotine having the composition of Fe7S8 , and pyrite. In the atmosphere, there was formed Fe7S8 and goethite. The increase in the stable Fe7S8 , leads to increasing the Cation vacancies concentration. Some iron ions close to there vacancies will be in the nonequilibrium state. The calculations done on the basis of iron ions, which are in the noneguilibrium state, and also on the basis of contents which are observed on the x-ray photograph during the experiment, are both in good correspondence.
Salmonokite is formed from pyrrotine, and it is not the result of the transformation of the other phases. It is established that on the basis of the thermodynamic potentials, using the Pauli quantum statistics, the most important role in this transformation is played by the cation vacancies in the pyrrotine structure. The theoretical analysis was carried out taking into account the interaction of the vacancies as well as without considering them.
The noneguilibrium iron ions and the absorbed water formed goethite. Its percentage correlates with the vacancies contents. The contents of salmonokite directly depend on the pyrrotine contents.
The conducted research shows that in the presence of the atmosphere, the forming jf new minerals is carried out owning to the cation vacancies of the mother plate.