

DESCRIPTION FOR THE GENERAL PUBLIC

The main objective of the proposed research project is description of anionic group substitutions SO_4^{2-} i CrO_4^{2-} in minerals belonging to the ettringite and baryte groups. These substitutions reveal changes of chemical composition and give a possibility to identify new mineral phases within these two groups. Minerals of the ettringite and baryte groups are a part of secondary, low-temperature, hydrothermal mineralization, which are present in veins and cavities in pyrometamorphic rocks of the Hatrurim Complex located in the territories of Israel, Palestinian Autonomy and Jordan.

Preliminary mineralogical studies confirmed a presence of Cr^{6+} -bearing ettringite and Se-analog of thaumasite, and also minerals of the baryte-hashemite series, in which substitutions of anionic groups were observed. Heretofore, mineral with selenium in chemical composition of the ettringite group has not been described. That allows to conclude that Se-analog of thaumasite is a potentially new mineral from hydrothermal veins.

Among the other objectives provided for realization in the proposal are: identifying source of Cr and Se in pyrometamorphic rocks; re-investigation of bentorite, mainly, definition its structure, and description of other minerals from studied hydrothermal association.

In the frame of the proposed project the following research tasks will be realized: field works to collect samples of rocks, preliminary processing and preparation of probes for different investigations using optical microscope and powder diffraction; for investigations with help of modern methods such as: scanning electron microscopy with EDS detector, electron microprobe analyzer, Raman spectroscopy and single-crystals XRD analysis. Also, the IC-PMS measurements will be performed to determine geochemical characteristics of pyrometamorphic rocks to establish a Cr and Se source in studied minerals.

The result of the proposed project will be description of isomorphic schemes in minerals of the ettringite and baryte groups and characteristics a new mineral - Se-analog of thaumasite. It should be noted that the proposed project is original and innovative, because nobody before did not pay attention for low-temperature hydrothermal mineralization in detail. Furthermore, discovery of new mineral is important event in the development of natural and industry sciences. The discovery of mineral with unknown structure gives a chance for synthesis of new advanced materials based on its structure, which may have a significant impact to industry. Minerals included in the proposed research project have the abilities to absorb toxic elements such as: Cr, As and Se, which makes them potential prototypes of cement materials used for protection of the environment in future.