

## MINERAL FORMATION PROCESSES IN KARST CAVE SYSTEMS OF THE MIDDLE MIOCENE BADENIAN GYPSUM (CARPATHIAN FOREDEEP, WEST UKRAINE)

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Giant labyrinth cavern systems (largest of them – Optimistic Cave – has a length more than 210 km) are a result of deep karst processes in the middle Miocene Badenian gypsum in the outer part of Carpathian Foredeep. These systems are characterized as lateral labyrinth networks of karst cavities. Air temperature in the caves is +8,2–10,5 °C, air humidity 96–100%, CO<sub>2</sub> concentration 0,1–4,8%, radon concentration up to 23700 Bq/m<sup>3</sup>. Original geological, physical and chemical conditions have determined a wide development of mineral formation processes here.

Minerals originated in karst cavern systems of the Miocene gypsum belong to classes of sulphates (gypsum, celestine), carbonates (calcite, rhodochrosite), silicates (chalcedony), oxides and hydroxides (minerals of iron and manganese, ice). Formation of minerals is determined by following processes:

- crystallization after evaporation of thin film of water (gypsum, celestite, calcite);
- crystallization after evaporation of seeping interstitial water (gypsum);

- crystallization from free flowing water after carbon dioxide loss (calcite, rhodochrosite);
- crystallization in clay filling of cavities (gypsum);
- crystallization from water in joints (gypsum, calcite);
- crystallization from aerosol (gypsum);
- subaqueous crystallization (calcite);
- crystallization from gels (chalcedony);
- biochemical precipitation (iron and manganese oxides and hydroxides);
- freezing crystallization (ice).

Processes of mineral formation in the karst cave systems of the Miocene gypsum are low-temperature. Minerals originated as a result of these processes occur in the form of specific aggregates – speleothems (crusts, stalactites, helictites, etc.). Subaerially-formed speleothems predominate, and their growth is controlled by air currents in the cavities.