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Sulphates and sulfides in sedimentary deposits of the upper jurassic of siberia russian federation

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In the sedimentary deposits of the Upper Jurassic of Siberia, among the authigenic components, sulfates Ca, Sr, Ba and sulfides Fe, Zn, Cu were detected. The results of the studies indicate that different mineral phases were formed under diagenesis for a short time interval, i.e. almost simultaneously. Following the method of actualism, the interrelation of the mineral forms of these chemical elements with biogenic complexes of the marine paleobasin has been established. In modern organisms, metals are part of ligand-molecules, are bridges connecting different groups in proteins and lipids, in aminoacids and sugars, etc. Algae from the family Rhodomelaceae for the creation of a strong framework synthesize phenates - products of substitution in the phenols of the hydrogen atom of the hydroxyl group by the metal Zn, Fe or Cu. Iron is involved in the structure of ferredoxin contained in chlorophyll of algae and bacteria. Ascidia (subphylum Tunicata) and Acantharea (radiolarians with a skeleton folded by SrSO4) is able to concentrate Ba. Calcium makes up the skeletons of many marine creatures. After the death of organisms and burial in the aerated sediment layers, partial or complete dissolution of their skeletons is possible, if the silt waters contain elevated concentrations of sulfate ions. One of the reasons is the oxidation of H2S, released as a result of the decomposition of the formaldehyde part of organic matter from the more submerged sediment layers. The consequence is precipitation of sulfate minerals. At the same time, a large group of bacteria, including aerotolerant species, during the process of sulphatreduction is able to use sulfur as an electron acceptor from aminoacids and prosthetic groups (Fe-S clusters, etc.), without spending sulphate ions of silt water. Thus, it is assumed that the biochemogenic formation of authigenic sulfides, for example pyrite, occurred within the organic matrix using Fe-S clusters of ferredoxin. Therefore, the formation of sulfates simultaneously with sulfides is possible.

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