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Abiotic biomorphs and genetic indication of geo-and astrobioproblematics.

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One of the major achievements of contemporary natural science is that it has broadened our understanding of the spatial and temporal limits and range of physicochemical conditions under which life is possible. The verge of the millennium has seen a flood of new scientific information suggesting that life on the Earth originated earlier than was generally thought; showing that life can exist under ultra-extreme conditions; revealing biomorphous forms in Martian and other meteorites, that on the basis of geochemical and mineralogical data are interpreted as fossilized remains; about discoveries of mysterious nano-scale organisms and complex hydrocarbon prebiological structures, that have almost bridged the gap between the biological and mineral worlds. Unfortunately, this information flow from the biological frontiers contains large proportion of uncertain data that is explained by challenges in genetic diagnostics of biomorphous structures, structural and morphological similarity between mineral and biological forms, absence of reliable biomarkers for strongly altered ancient biostructures.

Biomineral homologies and the associated convergence of properties by them constitute great obstacles for diagnostics of biomorphous problematica. In the mineral world especially among hydrocarbon minerals or solid bitumens analogies of bioorganisms or biostructures can be easily selected, which can be treated as biofossilies in the paleontological and astrobiological researches. Morphological convergence of mineral individuals and bioorganisms is caused by general forming factors. The factors are determined, on the one hand, by properties of structural-forming elements, in particular, by their symmetry (periodicity, twinning, chirality, molecular mimicry and

etc.), and on the other hand, they are determined by peculiarities of interaction with environment.

For solution of divergence indeterminancy in genetic indication of geo- and astrobioproblematics the more perspective ones can be:

- researches of morphology and anatomy of biomorphous structures, determination of relicts of primary (for biofossilizes of cell structure);
- determination of relic biomoleculars and the more complex biomolecular structures.
- analysis of typomorphism genetically related with biomorphs or minerals included in it (apatite, calcium, magnetite, pyrite etc.);
- decoding of genetic information containing in the biomorphous mineral structures by genetically informative mineralogy (isotopic geochronology, PTX-analysis etc.), distinguishing of primary and superimposed information, deliverance from informative “noise”.

Indicator biochemical components, helpful in recognizing recent and weakly altered organics (1) are easily destroyed under conditions of even low-grade metamorphism and, (2) almost all compounds considered as biological ones are synthesized in the abiogenic way under natural conditions. Besides, remains of ancient organisms are often contaminated with more recent and present-day organics. Isotopic biomarkers seem to be fairly reliable at the chemical level. In spite of all the various biomineral convergence of form, it is structural and morphological indicators that hold promise in looking for biomarkers. The most important elements of structure and form of bioorganisms are inherited as at their fossilization and well preserved in geological environments. At the same time, mineral matter, undergoing structural-molecular and morphological changes at metamorphism doesn’t replace abiogenic hydrocarbon structures. So, for solution of the problem of biomarkers of utmost importance are experimental fossilization of microorganisms and natural fossilization on the whole. (Grant SS-2250.2003.5)