

ENVIRONMENTAL MINERALOGY: CONCEPT, PROBLEMS AND PERSPECTIVE FOR THE XXI CENTURY

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The world of bioorganisms and the world of mineral individuals have been existing and evolving in intimate interaction and interrelationship as a single biomineral community, that is why mineral factors play a key role in bioecology. The principal goals of environmental mineralogy are: (a) study of biomineral interactions; (b) understanding the mechanisms of positive and negative mineral effects on bioorganisms; (c) analysis of technogenic changes in the mineral world; (d) looking for ways to reduce negative effects and enhance biomineral harmony. Living organisms never use minerals in their natural, i.e. crystalline state. Before being incorporated into a physiological process, mineral substance is disrupted (dissolved) and converted to an ionic or molecular form. The natural response of an organism to contacts with mineral individuals and aggregates is trying to destroy and reject them. Here, a barrier, protective function of an organism is at work, which determines the essence of environmental mineralogy. Its central goal is to enhance an organism's barrier reactions to mineral particles, in other words, to protect organisms from direct mineral action. Aggressive mineral effects on an organism can be classified as follows: (i) distant effects; (ii) tactile effects; (iii) pneumonic effects; (iv) alimentary effects; (v) pathogenic effects of pathogenic biominerals. The global tendency of the changing mineral world in the biospheric part of the lithosphere as a result of technogenesis is its oxidation, i.e. dramatic increase in the proportion of oxides and hydroxides. Without special measures, Earth may await the fate of the strongly oxidized planet of Mars. In the XXI century, environmental mineralogy will find new effective ways to anesthetize in environmental terms human expansion, optimize and improve human environment.