

**Mechanic- and nanostructured rocks in protective screens,
medicine and balneology**

**A.V. Panko¹, V.A. Oliinyk¹, I.G. Kovzun¹, V.A. Prokopenko¹,
E.V. Ablets¹, E.M. Nikipelova²**

¹ *F.D. Ovcharenko Institute of Biocolloid Chemistry, NAS of Ukraine,
42, Ak. Vernadskogo Blvd., Kyiv 03680, Ukraine
e-mail: gr.k.ibcc@ukr.net*

² *Ukrainian Research Institute of Medical Rehabilitation and Balneology, Ministry
of Health of Ukraine,
6, Lermontovskiy Lane, Odessa 65014, Ukraine*

Using the physical-and-chemical geomechanics achievements, models of physical and mechanical, nanochemical, colloidal and biocolloidal metamorphic processes of iron-silicate rocks have been proposed. These models are accompanied by formation of nano- and microdispersed pelagic sediments, peloids (healing muds), clays, sedimentary iron-silicate-carbonate ores and crystalline iron silicates (jaspilites).

A significant role in these processes of microorganisms and surface-active products of vital activity released by them is identified. The proposed models are proved both theoretically and experimentally using X-ray diffraction method, X-ray fluorescence analysis, thermogravimetric, electronic microscopy, rheological and medico-biological methods, laser correlation spectroscopy. The idea relating to a role of chemical transport transfer of iron and silicon nanoclusters in microparticles contact areas of polymineral carbon, iron-silicate and iron-hydroxide disperse systems is expanded. It is shown that accelerated transport transfer flows by isothermal distillation mechanism leading to increase contact interactions in a presence of sodium chloride (sea water, brine of lakes) and in quiescent conditions or in laminar regime. Transport process in turbulent regime under the influence of mechano-chemical factor is accompanied by nanochemical dispersing (dissolution) of contact formations and by viscosity reduction of disperse system. Taking into account established phenomena, application of iron-oxide-silicate peloid compositions in the construction of basin protective barriers, in medicine and balneology (treatment of injured joints, injuries, haemophilia and others) is considered.

1. *I.G. Kovzun, Z.R. Ulberg, A.V. Panko, V.A. Prokopenko, V.A. Oleinik, E.M. Nikipelova* Colloid-Chemical and Nanochemical Processes in Peloids on Basis of Ferrous Clay Minerals // Nanoplasmonics, Nano-Optics, Nanocomposites, and Surface Studies, Springer Proceedings in Physics. – 2015.-167. – P. 231-243.

2. *E.M. Nikipelova* Colloid-chemical properties of sludge peloids systems and main principles of their regulation. Dissertation, Institute of biocolloid chemistry named after F.D. Ovcharenko, NAS of Ukraine. – 2011. – 442 p.