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ABSTRACTS

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**THERMODYNAMICS OF SOIL CLAY-METAL-ORGANIC
COMPLEX (FORMULATION OF THE PROBLEM)**

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The clay-metal-organic complex of soils is spatially structured open nonequilibrium reacting system [1]. The input stream of initial chemical compounds is presented by organic products of photosynthesis and mineral products of catagenesis, metamorphism and magmatism. The output stream of final compounds is presented by thermodynamically stable products of a mineralization and weathering under supergene conditions. Component and phase composition of nonadditive ensemble indefinite polyvariant intermediate metastable substances in reactionary volume cannot be completely determined. Presence of a fluctuating frame structure of the rather hardly bonded elements creates real physical pre-conditions for protection of local stochastic metastable states, for example, through changes of energy characteristics of conformational degrees of freedom and through "management" of mass transfer processes.

The system is one of the basic reservoirs adapted for organic carbon sequestration in biosphere. In connection with change of a climate and growing emission CO₂ there was a necessity of physicochemical modelling of its behaviour. System functioning is reduced to maintenance of its kinetic stability. Therefore approaches within the frame of classical statistical thermodynamics are represented not creative. The principle of the "partial equilibrium", based that formation of intermediate products on a path to complete equilibrium reduces the general free energy of system faster, than formation of final stable phases has appeared the convenient tool for physicochemical modelling of weathering under supergene conditions [2]. However biomineral interactions were not taken into account. There is the question. Whether there will be essentially creative a principle of "partial equilibrium" for the description of behaviour of natural organo-mineral systems which have more high level of complexity, than weathering crusts?

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References

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