PHYSICAL AND CHEMICAL FUNDAMENTALS OF ENERGY-ELEMENT SYSTEM STATE CHANGING

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Introduction

In series of works [1-3] authors proposed a concept of energyelemental change of state of matter. It is shown that it is more rational to carry on a description of system and process properties at transition from one state to another using properties of separate elements (э), which form the system, and separate energy (*e*) components of the system.

Results and discussion

Any system represents a conjunction of qualitative and quantitative sets of energies (E) and elements (Э) being in continuous conversion from one energoelemental state to another. This kind of energoelemental approach to property description of systems and processes running in them is based on three fundamental laws: law of conservation of mass, energy conservation law and law of motion of matter. And at the same time it permits to present these laws as a unified mathematical (equation 1) and graphic (fig. 1-3 [1-3]) expressions.

Value Δf (E; Э) is a quantitative characteristic of energoelemental lag of the system. Diagram 1 shows a value of relationship of energoelemental lag of systems f_c (E; Э) composed of p, s, d or f- elements towards each other at a change of environmental energoelemental state $f_{environm.}$ (E; Э). System layout is a result of comparative analysis of electron distribution pattern in atom, mass numbers, radii of atom, values of electronegative systems of p, s, d or f elements. Diagram 1 enables to visualize connection between a general mechanism given by periodic system and mechanism described by energoelemental systems state diagrams. Low values of energoelemental lag Δf (E; Э) (valence electrons are situated at external electron level, relatively low values of mass numbers and radii of atoms, high values of electrical negativity) inhere in systems composed of hydrogen (H) and p-elements of periods 2-3, groups IV-VI (hereinafter H, p-elements) of Mendelyeev periodic table.

For the most part these systems are gases or liquids and have low values of energoelemental lag as compared with systems consisting of s, d or f-elements (in terrestrial conditions they are generally solid substances). Even relatively insignificant changes of energoelemental state of environment (at the expense of energy constituent) are able to change internal energoelemental state of the system on the basis of H, p-elements.

Introduction of a function of energoelemental state of system concept f (E; Э) and a function of amount of change of the state of matter Δf (E; Э) enables to give a graphic presentation of Le Chatelier (fig. 2). At the change of equilibrium state of environment (external energoelemental system) an equilibrium state of the system at issue (internal with respect to environment) changes too.

Low values of energoelemental lag Δf (E; Э) of systems (fig.1) composed on the basis of H, p-elements provide these systems with ability to change their energoelemental state not only following artificial one but after a natural change of energoelemental state of environment too.

Quantitative plotting that describes artificial complex influence of different energy components (gravitation, thermal, ionizing, ultra-violet, optical radiation, sound, medium density, etc.) upon a change of state H, p-element systems is in the field of prospective studies.

Presently a qualitative analysis is possible. The system passes it on the basis of H, p-elements (biosystem) under the influence of a natural change of energoelemental state of environment. Introduction of a concept of function of energoelemental state of system f (E; Э) enables to represent this way in a graphic form (fig. 3). A natural energoelemental way passed by a biosystem, is cycle-composite and provides for the cycle conditioned by axial rotation of the Earth (curve 3, $\tau'_c = 1$) and the cycle conditioned by revolution of the Earth round the Sun (field between the curves 1,2; $\tau''_c = 365$).

$$V = \frac{\Delta f(E,Э)}{\tau} \qquad (1)$$

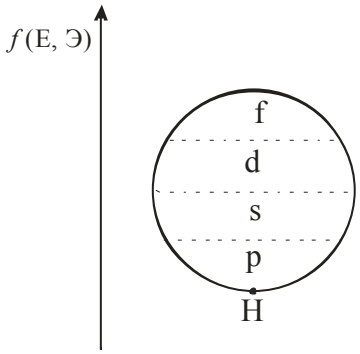

Fig. 1

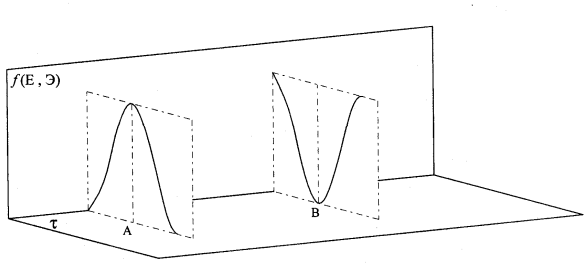

Fig. 2

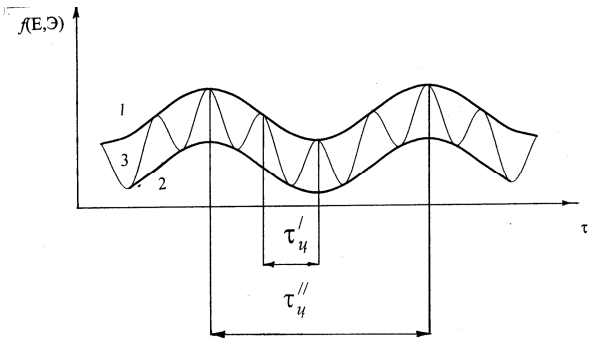

Fig. 3

One could say about nanomotion of the system

$$\begin{matrix} e_1,\ e_2,\ \ldots\ e_n \\ Э_1,\ Э_2,\ \ldots\ Э_n \end{matrix}$$

according to a definite energoelemental way during a definite time as about necessary and sufficient condition for arising and existence of biosystem in energoelemental field of environment.

CONCLUSION

1. A physicochemical characteristic *f* (E; Э) – a state of matter function or function of a energoelemental state of system is introduced.
2. A comparison chart of qualitative values of energoelemental function *f* (E; Э) for systems formed by different sets of elements Э (p, s, d, f) and energy E (fig.1) is presented.
3. A graphic expression (using *f* (E; Э)) of Le Chatelier principle (fig.2) is proposed.
4. Mathematical (equation 1) and graphical (fig. 2, 3) expressions of the way that energoelemental system (physical, biological) passes at nanolevel under the action of artificial and/or natural change of energo-elemental state of environment.

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