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Dynamics of Electrolyte in the Vicinity of Ferromagnetic Solids Under Magneto-Chemical Treatment

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The interaction of metal surfaces with electrolytes leads to the autocatalytic formation of spatiotemporal structures [1]. The study of the mechanisms of such reactions is related with the difficulties due to the separation of electrolyte and changes in the dynamics of its motion, and, consequently, in the reaction mechanism. The aim of the present investigation is to study the processes of formation and dynamics of phase states of the electrolyte, its separation and correlation of the indicated processes with the arising of self-organized structures and with the peculiarities of electrochemical processes in a uniform magnetic field.

We used the medium similar to that used in [1] as a model one as the magnetic field applied to it allows to stimulate the autocatalysis of the reaction. Due to arising of such structures, the refractive index and the optical transparency of the electrolyte change. Because of the fact that the intensity and distribution of the magnetic field does not change during the reaction, the dynamics of the change in phase distribution of the electrolyte is caused by the changes in acid and reaction products concentrations, and, consequently, by the mechanism of the reaction. The statistical characteristics, in contrast to integral ones, do not give information about the characteristic frequencies of the electrolyte flows, but show their configuration and intensity. As a whole, by using these characteristics we can make conclusions on both reaction mechanisms and sites of its maximum and minimum intensities. Finally, it allows both to study the peculiarities of the reaction and to determine corrosion areas of metallic compounds in terms of dynamical characteristics of electrolyte.

1. *Derecha D.O., Skirta Yu.B., Gerasimchuk I.V.* Technique for Determining Fluids Motion Characteristics in the Vicinity of Ferromagnetic Solids Under Magneto-Chemical Treatment // Nanoscale Research Letters.-2015.**-10**.-P. 440-4.