20.11.2019 Kyiv, Ukraine

Dear Dr.sc. Višnja Horvat-Radošević,

On behalf of my co-authors, I am sending for publication our paper “On the Processes of Migration and Diffusion in the Systems with Solid-State Reagents”. Please, excuse us for some delay due to overloading by education and research work.

The ideas about the diffusion of protons (or ions of lithium, sodium) in solid state, for example in the electrodes of power sources with a solid-state reagent, can be frequently found in modern electrochemical literature. Moreover, it is usually believed a priori that it is the diffusion of cations that retards the discharge (charge) of electrodes. Then, an attempt is made to calculate the coefficient of diffusion of cations in solid state, D, based on experimental data, proceeding from the assumption that the Fick diffusion equation can be applied to experimental dependences. In their attempt to justify the model of diffusion of protons (cations) in the solid phase, some authors cite the linear relationship between peak currents, $I_{max}$, in voltammetric curves and the square root of potential scan rate $\sqrt{\vartheta}$ by way of proof.

We do not agree with such approach and discuss in this paper the main contradictions of the diffusion model. Moreover, we have proven theoretically and experimentally that the existing linear dependence of the peak currents, $I_{max}$, on $\sqrt{\vartheta}$ and, by the way, potential difference between the anode and cathode peaks, $\Delta E_{max}$, does not provide evidence for diffusion limitations but rather indicates that there is a limited reserve capacity, $Q$.

Thus, publication of this paper can help to understand the real mechanisms of processes in solid state electrochemical systems and to give possibility for scientists to increase the practical results in the fields of electrochemical power sources, sensors, defense of metal corrosion, etc.

The manuscript concerns original unpublished results and the manuscript is not simultaneously in publishing procedure of some other scientific journal.

Thank you in advance for the benevolent expertise of our paper and its publication.

Best regards,

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