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Innovations in development of the basis of technical solutions in chemistry and metallurgy

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For a long time, we have conducted research on the effects of non-stationary energy effects on chemical systems and the microstructure of condensed systems. The basis of these studies were general conclusions from the works of M. Faraday, who play a crucial role in the development of ideas about the nature of chemical bonding and the practical application of electrochemical processes. In particular, we proposed to use combined electrochemical reactions to reduce the number of technological operations in the chain of raw materials - the final product. The meaning of a combination of reactions: the production of a leaching agent and the process of metal extraction in the volume of a single reactor. Since the crystalline forms in which the base metals are found may differ not only in terms of the structure of the mineral formations, but also in the physical properties of the minerals, which are determined to be identical due to the texture, degree of metamorphism and structural features at the nano-level, modern technological enrichment schemes multicomponent ores lead not only to the production of industrial products that have their own physical and chemical characteristics, but also to losses of valuable metals. Concentrates are formed having their own characteristics that require changes in the technological parameters of their processing. The proposed technology allows us to ignore some features of minerals containing base metals and to avoid the irretrievable loss of metals to a significant degree. For example, when studying the possibility of leaching of lead and zinc from mineral formations by the method of combined electrochemical reactions when extracting lead and zinc from ore dressing products, the experiments used collective flotation concentration concentrates of ores from the Shalkiya deposit. The chemical composition of the collective lead-zinc concentrate: % (wt.): 14. 94 Si; 5.68 Pb; 14. 57 Zn; 6.26 Fe; 14. 96 S; 6.94 C; 2.11 Ca. In laboratory conditions for lead, extraction rates are, respectively: at current density 50 A/м2 - 16,2 %, 100 A/m2 - 19,6 %, 150 A/m2 - 23,5 %. For zinc, these figures are, respectively: at current density 50 A/m2 - 2,6 %, 100 A/m2 - 8,7 %, 150 A/m2 - 9,3 %. Leaching time 30 - 240 minutes. Another example of the use of the findings of M. Faraday on the relationship of the energy of a chemical process is the chemical reaction between the components of the gas phase and the oxide melt. So the change in the voltage of the electric passing through the melt creates the possibility of gas absorption by the melts in a significant amount (1200 cm3 per 25.49 g of the melt). Even visually, you can set an unusual variety of chemical reactions that occur in the gas / oxide melt system under the influence of non-stationary electric current. It was noted that carbon monoxide, when interacting with a liquid (melt), can be decomposed into oxygen, which goes into the structure of the liquid, and elemental carbon, which is deposited on the walls of the reaction vessel. Further research in the direction of utilization of carbon oxides should be carried out in order to search for such a liquid / carbon oxides system that would provide a reaction at low temperatures. The possibility of developing such a technology is provided by the influence of the parameters and form of the electrical signal on the course of the most unexpected chemical reactions.