

YAKOV MIKHAILOVICH KOLOTYRKIN (ON HIS SIXTIETH BIRTHDAY)

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November 14 was the sixtieth birthday of Ya. M. Kolotyrkin, an outstanding scientist in the field of electrochemistry and corrosion and a Corresponding Member of the Academy of Sciences of the USSR.



Ya. M. Kolotyrkin

Upon completing his studies in electrochemistry at Moscow State University in 1937, Kolotyrkin joined the laboratory of surface phenomena of the L. Ya. Karpov Physicochemical Institute. All his subsequent activity was associated with this institute, within which he founded a laboratory and then headed the Department of Corrosion and Electrochemistry of Metals.

In Kolotyrkin's first investigations, carried out jointly with A. N. Frumkin, rigorous proofs were obtained for the electrochemical nature of the dissolving of solid metals in acids, and the possibility for application of the laws of electrochemical kinetics to these processes was established. This was the cornerstone for a quantitative theory of dissolving of metals and opened a route for the broad application of modern electrochemical methods for investigating corrosion. A great deal of attention was also directed to the investigation of the effect of the structure of the double layer and the adsorption of anions on the evolution of hydrogen, an investigation which played a large role in the development of electrochemical kinetics and, particularly, in the development of concepts regarding the mechanism of corrosion processes.

The subsequent successful development of a theory of dissolving metals was inseparably associated with the potentiostatic method of investigation. Kolotyrkin had the initial and leading role in the development of this method and its general introduction into practical corrosion investigations in the USSR. The systematic study of the dependence of the rate of dissolving of metals on potential enabled him to arrive at a theoretical basis for a number of methods for protecting metals from corrosion and to project means for the rational selection of corrosion-resistant materials.

The investigations of Kolotyrkin and his co-workers made a substantial contribution to the formulation and development of modern concepts on the nature of passivity. These investigations established and explained the fundamental kinetic principles of the ionization of a passive metal and made it possible to draw a conclusion regarding the absence, in the general case, of a fundamental difference between the phenomena of anode and chemical passivation. In addition, experimental confirmation of the effect of water as a passivating component of the solution was obtained, and the important role of anions in the disruption and generation of the passive state was established.

Kolotyrkin's inherent inclination to explain the detailed mechanism of electrode processes was graphically manifested in his studies on the comprehensive basis of the concepts of direct participation of solution components in the elementary stages of the dissolving of metals. The establishment of the substantial role of the chemical reaction of the metals with the solution components led to a conclusion regarding the

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fundamental possibility of their dissolving, not only via electrochemical mechanisms, but also by chemical mechanisms, and was experimentally confirmed in the subsequent works of Kolotyrrkin and his co-workers.

The profound electrochemical approach to the investigation of dissolving and passivation of metals enabled Kolotyrrkin and co-workers to make a substantial contribution to the solution of a number of practically important corrosion problems, such as pitting and intercrystallite corrosion, corrosion of platinum anodes, anode protection, phosphate inhibition, etc.

Kolotyrrkin's investigations received wide recognition not only in our country but also abroad; he was always one of the major speakers at international congresses on corrosion.

His constant striving for a creative solution of complex problems, and his ability to promote and incorporate into his life new ideas characterize not only his scientific creativity but also his entire, multifaceted scientific-organizational activity. He has long been the director of the L. Ya. Karpov Physico-chemical Institute and is head of the Scientific Council on the problem of corrosion for the State Committee on Science and Technology. He is also the research director for the problem of corrosion in the Council of Economic Mutual Assistance, and is the Chief Editor of "Zashchita Metallov." In 1969, Kolotyrrkin was elected deputy of the Moscow Council.

Kolotyrrkin's versatile activity is highly esteemed. He was awarded the Order of Lenin, the "Sign of Honor," and numerous medals.

Because of his outstanding qualities as a scientist and organizer, Kolotyrrkin enjoys the deserved authority and profound respect of his numerous students and colleagues. To a significant degree, this is due to his personal qualities: his principles, modesty, objectivity and sobriety of judgment, his capacity to kindle new ideas and simultaneously subject them to the most rigorous critical analysis, and his genuine talent in knowing how to direct the research of the scientific collectives. In all this there is the guarantee of novel and great future triumphs for Ya. M. Kolotyrrkin.