ABSTRACT

Modern electrochemical technologies for surface treatment of titanium alloys to create protective, antifriction, dielectric and catalytically active materials are considered. The physicochemical fundamentals of the processes of plasma-electrolytic formation of conversion and composite electrolytic coatings are highlighted. Separate stages of electrode reactions, regularities of the influence of electrolyte components and electrolysis parameters on the composition, structure and morphology of synthesized materials are examined in detail. The monograph summarizes the results of the project "Development of nanotechnology for the synthesis of functional galvanic coatings for electrical equipment."

The monograph is designed for specialists in the field of chemical technology, as well as teachers, graduate students and students of higher educational institutions.

CONCLUSION

In this monograph we have represented a highly performed review of the up-to-date results of theoretical and experimental surveys on nanocomposite coatings formation. Considerable attention was paid for improving the technology for producing nanostructured composite electrolytic coatings based on active dielectrics, fluoropolymer-filled and mixed oxides, including rare and refractory metals.

The classical technologies of composite systems are distinguished by high complexity, energy and material consumption, a significant number of stages, while those oriented to the transport and chemical industries are distinguished by the use of noble metals. For this reason, the chemical-technological processes of the formation of functional nanocomposite coatings and materials on metal carriers described in the monograph are of considerable interest, since they organically combine the undoubted advantages of metal carriers with the unique capabilities of electrochemical methods of controlled synthesis of materials.

The textbook can be useful for a wide range of readers interested in protection coatings formation and for scientific researchers and engineers involved in nanotechnology of composite coatings. In the monograph significant attention is given to one of the modern methods of surface treatment - plasma-electrolytic oxidation, which allows forming oxide coatings firmly adhered to the base with high physico-chemical and mechanical characteristics: dielectric, protective, antifriction on these surfaces.