

Co-Mo-W Galvanochemical Alloy Application as Cathode Material in the Industrial Wastewater Treatment Processes

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Abstract. The article deals with the role of electrodes materials in improving the industrial wastewater treatment from pollutants by electrochemical action. The instability constants of the complexes and coordinated ligand molecules were calculated. Based on the research conducted regarding the rationalisation of the poly-ligand electrolytes and electrolysis modes, a variative flow scheme of the coatings deposition by triple alloy has been developed. The corrosion resistance characteristics of the coatings obtained in the form of alloy, that were obtained from complex electrolyte that satisfy the necessary coatings requirements for effective treatment of wastewater have been researched. The obtained coatings have better corrosion resistance than in special steels of electrochemical purpose.

Introduction

In Ukraine, according to the State Water Resources Agency [1], over 48.5 thous. tons of harmful pollutants of the second and third hazard classes have been discharged to the surface water in recent years. Over 18% of the total wastewater discharge is contaminated water, non-purified or insufficiently purified at purification works. Water resources are used by sectors of the economy without sufficient measures to prevent their pollution [2]. Most of the contaminator enterprises belong to the utilities sector – 74, to the industry – 18 (the largest ones of them – ironworks – 6). The total number of enterprises discharging the wastewater to the natural water bodies is 539, the total amount of contaminated return water or wastewater discharge – 952 mln m³ per year. Out of this volume more than 95 %, 918,6 mln m³ are discharged by the 100 major contaminators. It happens due to the fact that of taking place the return- or wastewater discharging without a sufficient degree of decontamination for compliance with the established maximum allowable norms in permits for special water use. Almost two-thirds of enterprises from this anti-rating are located in the territory of 5 regions: Dnipropetrovsk – 24; Donetsk – 19; Lviv – 7, Kharkiv – 7, Luhansk – 6. The specified situation needs an increase in wastewater treatment efficiency and deepness. Biochemical technologies allow achieving a deep purification of these effluents [3], but they are characterized by the effects selectivity, need for narrow process modes maintaining, pretreatment technologies application and need for significant areas to arrange basins and reservoirs.

Main Part

The most effective, compact, with a high nomenclature of effects are electrochemical technologies of wastewater treatment. These methods allow extracting valuable products from wastewater for further use at a relatively simple flow scheme without using chemical reagents and with insignificant energy input. When wastewater passing through the electrolyzer inter-electrode space of electrolysis of water and particles polarization occurs, electrophoresis, oxidation-reduction processes, electrolysis products interaction with each other, flotation and coagulation processes

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