FORMATION OF OXIDE CONVERSION COATINGS ON GALVANIC ZN-NI ALLOY IN SATURATED CA(OH)2 SOLUTION

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Abstract

The galvanic Zn-Ni alloy coatings are ones of the most effective anodic coatings, which are used to corrosion protection of steel elements. In spite of the excellent anticorrosion properties of the Zn-Ni coatings, for the sake of a fact that they do not fulfill the industry requirements, a realization of additional treatment improving their corrosion properties is most often necessary. In order to significant improvement the corrosion properties of zinc-nickel alloy coatings, the conversion coating formation on their surface is realizable.

The results of investigations on surface morphology, chemical and phase composition as well as corrosion properties of anodically oxidized Zn-Ni alloy coatings electrodeposited on steel substrate have been presented in this work. The process was carried out in saturated calcium hydroxide solutions. The XRF, XPS, XRD analytical methods have been used in the research to determine the composition of the formed layer. The corrosion properties were characterized by potentiodynamic polarization method. The SEM images received during the microscopy research showed, that the structure of coatings was changed. On the basis of the realized investigations on their composition it was found that the conversion coatings consisting mainly of zinc oxide is formed in the result of anodic treatment of the Zn-Ni coatings in the hydroxide solution. Moreover, the results of the XPS studies indicated that zinc hydroxide as well as nickel oxide and nickel hydroxide were also formed on the coatings surface.

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