

Anna Maria BIAŁOSTOCKA¹, Wojciech WALENDZIUK¹

Białystok Technical University (1)

The continuous measurement of the potential during the process of the electrochemical copper setting

Abstract. In the article will be presented usefulness of the computer modeling support through the remote measurements in the electrochemical technologies. Modeling of the electrolytic covers demand of problems solution connection with current distribution in the electrolyte, electrodes shape and composition of the electrochemical environmental in which the process takes place. Adapted methodology is used to potential analyze and its influence on the covered layer structure and its topology. Classification of methods properties makes possibility of its valuation in the case of elasticity, usefulness in the galvanic process and conforming in practice.

Streszczenie. W artykule przedstawiona zostanie przydatność komputerowego wspomaganie modelowania poprzez przeprowadzanie zdalnych pomiarów w technologiach elektrochemicznych. Modelowanie powłok elektrolitycznych wymaga rozwiązania problemów związanych między innymi z rozkładem prądu w elektrolicie, kształtem elektrod i składem elektrochemicznym środowiska, w którym zachodzi proces. Zastosowaną metodologię wykorzystuje się do analizy potencjału jego późniejszego wpływu na strukturę osadzonej powłoki i jej topologię. Klasyfikacja własności tej metody umożliwi jej ocenę pod względem elastyczności i przydatności w procesie galwanizacji oraz możliwość późniejszego zastosowania w praktyce.

Keywords: electrocrystallization, electrode processes, copper surface layer, additive electrodes.

Słowa kluczowe: elektrokryształizacja, procesy elektrodowe, powierzchniowa warstwa miedzi, elektrodo dodatkowe.

Introduction

In the present engineering the very big role play the metallic layers setting on the surfaces the electrocrystallization method. About the metal's structure and its quality decided in main measure current parameters and electrolyte composition. In the article was presented the electrocrystallization question in the theory and its effects in practice in the form of results of research-microscopic structures.

Basis of the copper electrocrystallization

The copper electrocrystallization process based on the copper deposition on the electrode surface – cathode. The other electrode – anode is made from deposited metal (in our case – copper). During the process of the copper layer deposition, on the cathode surface takes place the reaction of the two-positive copper ions reduction to the atomic shape. On the anode's surface takes place an opposite process – oxidation of the copper atoms to copper ions. In result the copper layer should be evenly deposited on the given product surface.

Final view of the product is depend on many factors, for example: kind of crystal phase, kind of electrolyte, kind of substrate material, its structure and the other parameters. Such as current density, temperature of the electrolyte solution, its pH. Consider process has application in the wide range of industries. Very important is the fabrication of moulds. Deposition of the metallic layer should gives the mould, which is an exact copy of the final product. General aim of the researches is the guaranty of the mould fit and the same homogenous mould form's thickness.

Methodology of the researching

It was carried two kind of the experiments. They concerned electrochemical setting by the different value of

the current density ($\frac{A}{dm^2}$; $2,5 \frac{A}{dm^2}$ (2)). During the experiments was carried the potential measurements on the cathode surface. The potential was measured in vertical

orientation, in the middle part and in the edge part of the cathode.

By the help of professional software installed in the Electrochemical Universal Meter and strict laboratory position during the computation, the value of the potential was pointed.

Results of investigation and their analysis

Proximity of the edge has the direct relationship with the different values of the potential.

Visible unevennesses near the edge of the cathode confirm the theoretical foundation. Exact and continuous electronic measure helped at the end of computation created the potential field distribution.

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Authors: dr inż. Anna Maria Białostocka, Politechnika Białostocka, Wydział Elektryczny, Katedra Elektrotechniki Teoretycznej i Metrologii, ul. Wiejska 45d (pokój 259), 15-351 Białystok, e-mail: a.bialostocka@pb.edu.pl; dr inż. Wojciech. Walendziuk, Politechnika Białostocka, Wydział Elektryczny, Katedra Elektrotechniki Teoretycznej i Metrologii, ul. Wiejska 45d (pokój 204), 15-351 Białystok, e-mail: w.walendziuk@pb.edu.pl