

ELECTRODEPOSITION OF METALLIC LAYERS FROM APROTIC ELECTROLYTES

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Introduction

First, the basic concepts of galvanic electrodeposition will be surveyed. The preparation of aprotic electrolytes (both liquid and gelous polymeric ones) and subsequent galvanic electrodeposition of metals will be described in experimental part. The morphology of the layers formed under named experimental conditions will be investigated using an environmental scanning electron microscope.

Electrolytes

Liquid electrolytes were prepared as solutions of metal perchlorates in propylene carbonate. The same solutions were used for the preparation of gels by an addition of Superacryl (methylmethacrylate resin prepared by polymerisation of methylmethacrylate and commercial polymerization agents) [1]. A rather tough gel was formed in 24 hours. The use of PVC as gel forming agent was unsuccessful.

Metal deposition

The electrodeposition was performed on copper and/or cadmium electrodes, both from liquid and gel electrolytes [2, 3]. The influence of time on the process was studied. The current decreased from initial value almost to zero and it remained on that level for the whole time interval of the experiment. Then all reminders of the gel were removed from the electrode surface by rinsing in chloroform. No differences were observed between the electrodeposition on copper and cadmium substrates. Copper electrodes were used for further experiments.

Discussion

All samples obtained from gel polymer electrolytes follow more or less the original relief of the starting electrode surface such as is the set of parallel grooves. The influence of surface homogeneity on dating of used gel polymer electrolytes is displayed on Figs. 1 and 2. Fig. 1, gel age 72 hours shows eliminating of cadmium formed as needles on granulated base. Fig. 2, gel age 168 hours, shows eliminating only granulate base and the result gets better homogeneity.

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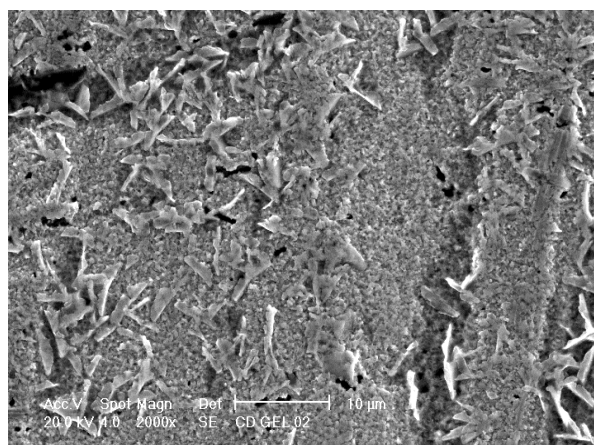


Fig. 1 Electrode surface on exp. 10 μm, gel age 72 hours

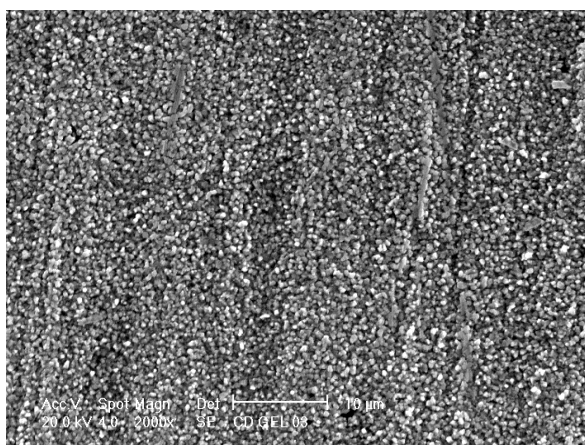


Fig. 2 Electrode surface on exp. 10 μm, gel age 168 hours

Electropolishing of the electrode surface would be important. In future, co-deposition of various metals (electrochemical deposition of alloys) will be the subject of following investigations.

References

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