CONTRIBUTIONAL REACTIONS IN ELECTROPLATING

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The main cathode reaction in electroplating is the reduction of metal ions, but often not one, but several reactions take place. These may be the reactions of proton donors and other electrolyte ingredients. Due to electrochemical processes on the electrode, chemical reactions may occur in the electrolyte, such as changes in the ligand composition of metal complexes, up to the formation of insoluble hydroxocouples. The interaction of reaction products can influence the mechanism and speed of the total process, for example, the effects of superpolarization and depolarization during alloy deposition.

At the initial moment of the process of metal deposition on a more electrochemically active base there is a conjugate spontaneous dissolution of the base (contact metal exchange), and passivation of the base metal can also occur.

Accompanying reactions influence the quality of electroplating, because they are accompanied by most of the processes in electroplating. On the contrary, ideal cases of precipitation formation in the absence of accompanying reactions are extremely rare, for example, in the electrorefining of copper. Conjugate reactions can be favorable, for example, providing inclusion of oxides in the sediment during the formation of black coating[1]. In some cases, they are undesirable, because they reduce the adhesion of coatings with the base[2], disturb the composition and balance of the bath, lead to the appearance of undesirable inclusions in the sludge. In conclusion, it can be said that when receiving galvanic coating, the associated reactions in very often determine its quality and functional properties.

References
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