

“Nanostructured surfaces”

Deposition of the nanostructured metals on an aluminum and silicon by galvanic replacement

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In the last decade, galvanic replacement of metals is considered, as one of the most effective methods of surface modification by nanoparticles [1, 2]. However, a spontaneous development of such process makes difficult to control particles formation on a substrate. Galvanic replacement of copper, silver, gold, nickel, palladium on the surface of aluminum and silicon were already started. It was found, that similar to electrolysis, high cathode polarization is the main reason to form nanostructured metallic particles through reduction of metal complexes in organic aprotic solvents. The tendency to get nanosize of the particles is manifested with the increasing of the complexes stability and concentration ratio of the free ligands to the metal ions. Duration of the process leads to completeness of the surface occupation through coalescence of the appeared particles. Therefore depending on the time formation discrete nanoparticles or thin films might be possible in practice.

The aim of this experimental work is to find dependence of particles morphology, their shape and size on the precursor/environment composition and parameters of the galvanic replacement.

1. Ai J.H., Liu S.P., Widharta N.A., Adhikari S., Anderegg J.W., Hebert K.R. Copper Layers Deposited on Aluminum by Galvanic Displacement // J. Phys. Chem. C. – 2011. – **115**. – P. 22354-22359.

2. Ego T., Hagiwara T., Morii Y., Fukumuro N., Yae S., Matsuda H. AFM Analysis for Initial Stage of Electroless Displacement Deposition of Silver on Silicon Surface // ECS Transactions. – 2013. – **50**. – P. 143-153.