Laser Micro Structurization of Titanium Surface in Liquid and Subsequent Galvanic Metal Deposition

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In this work a new technology for creating cone-shaped microstructures and filamentary nanostructures on the Ni films surface with an overall thickness of several microns is considered. At the first experimental stage, the microstructuring of the titanium target surface by pulsed laser ablation in liquid media at room and cryogenic temperatures was performed. The second stage consisted in electroplating of a 7 microns nickel layer on the laser-induced Ti structures surface. The subsequent mechanical separation of the formed nickel layer from the titanium target leads to the production of micron, submicron and nanostructures on a nickel film. It is shown, that the dimension of the Ni structures depends on the surface relief after laser exposure, and it can be varied by changing of the laser radiation fluence. Thus, thin nickel films with a high specific surface area are created. It is known, that nickel has the same catalytic properties as palladium, but it costs considerably less. Thus, the results of this work can form the basis for the creation of cheap and cost-effective nickel catalysts that are not inferior to catalysts based on Pt and Pd.

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