

## Nanocomposites and nanomaterials

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### **Fabrication of gold-coated nanoporous anodic alumina.**

Porous anodic alumina (PAA) is a new, interesting material for the development of ordered structures at the nanometer scale. It has been widely investigated for various applications in the field of micro- and nano- technologies, such as highly ordered templates, photonic crystals, high-density recording media, membranes, sensors and biosensors, including plasmonics, metal-cladded waveguide based sensors [1] and SERS. Control of the size and ordering of pores arrays are the subject of interest for all applications.

The aim of the work is the investigation of PAA and gold-coated PAA formed on thin Al films and on the surface of bulk Al. Aluminum films are deposited by DC magnetron. Constant voltage and constant current anodization in two-electrode cell configurations were performed.

The results of XRD, SEM and AFM studies of Al, PAA and Au/PAA films after anodic oxidation and etching for pore widening are presented. Under investigation is the correlation between the modes of aluminum films formation, anodizing regimes and structures of PAA and Au/PAA films. Ways of technology optimization for different applications particularly optical sensors [1] and surface enhanced spectroscopy substrates [2] are proposed.

1. *Voitovich I.D., Lebyedyeva T.S., Rachkov O.E. et al.* Anodic Alumina-Based Nanoporous Coatings for Sensory Applications // Springer Proc. In Phys. 167. Nanoplasmonics, Nano-Optics, Nanocomposites, and Surface Studies. Selected Proc. Of the Second FP& Conf. And the Third Int. Summer School Nanotechnology: From Fundamental Research to Innovations, Aug. 23-30. - 2014.- Yaremche-Lviv, Ukraine.- P. 423-431
2. *A. Kassu, C. Farley III, A. Sharma, W. Kim and J. Guo.* Effect of Pore Size and Film Thickness on Gold-Coated Nanoporous Anodic Aluminum Oxide Substrates for Surface-Enhanced Raman Scattering Sensor // Sensors. - 2015. - **15**. - P. 29924-29937