

Nanocomposites and nanomaterials

Formation of nanoporous anodic alumina by anodization of aluminum films on glass substrates

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Nanoporous anodic alumina (NPAA) is a material of great interest in nanotechnology because of perspectives of application in a great variety of fields, such as energy, nanofabrication, biotechnology and biosensing [1]. For wide range of applications it is necessary to generate NPAA from Al film deposited on substrate (glass, Si et al.). As it was shown formation of NPAA on Al films is different from NPAA formation on massive Al and influenced by deposition processes and regimes [2].

This work is devoted to the study of the fabrication of porous anodic alumina by anodization of the aluminum films that were deposited on glass and Si substrates by DC magnetron sputtering. The relationship between surface morphology of the deposited aluminum films and NPAA films was investigated by SEM analysis. The forming process of NPAA and residual layer of Al on glass has been explored by current-time curves and reflection curves obtained in the process of anodic oxidation. It is shown that grains boundaries of Al films limit the size of alumina cells and ordering of pores in NPAA.

The developed technology of anodic alumina porous films thickness of 50 nm - 1000 nm on glass substrates can be used as nanostructured coatings in a metal clad waveguide (MCWG) and surface plasmon resonance (SPR) sensors [3].

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