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Enhanced metallized nano-porous aluminum oxide films: Principles of obtaining main results and applications

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Exploring the emerging trends in the realm of nano scale electrochemistry in particular the creation of nano porous aluminum oxide (NAO) is a topical problem of modern material engineering. For example NAO films with a high and average density of pores can be used in micro/nanoscale lasers with indirect electrical pumping by laser diodes. Metallized NAO films with ultrahigh density of pores are preferable for optical interferometric chemical sensors. Films with low density of pores are used in the selective interference coloration of the metal surface improving of the corrosion resistance of the metal. Determination of the optimal conditions of the aluminum electrochemical anodization and electrochemical and chemical metallization for each particular case is important task. This work was aimed at obtaining optimal conditions of the metallized NAO films with ultrahigh, average and low density of pores and the study of its applications. In the present study, the optimal conditions of the aluminum electrochemical anodization and electrochemical and chemical metallization were determined. Metallized NAO films with ultrahigh, average and low density of pores were obtained using the optimal conditions and were further characterized using high resolution scanning electron microscopy and the reflective interference spectra (RIFS) in a wavelength range of 235–735 nm at different angles.

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