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**Fabrication and Structural Studies of Nanostructured Alumina Templates Using X-Ray Diffraction and EDX Techniques** KRISTINA E. LIPINSKA-KALITA, PAVAN SINGARAJU, BISWAJIT DAS, Department of Electrical and Computer Engineering, University of Nevada Las Vegas — We have previously developed a thin film template based nanostructure fabrication technique that is applicable for the development of high performance photonic devices. The template is created by the anodization of thin film aluminum deposited on an arbitrary substrate and contains nanoscale pores inside which a nanoscale material could be synthesized. An alumina template is characterized as a nonstoichiometric, amorphous film that is optically transparent over a wide spectral range and is also electrically insulating, which makes it a perfect embedding material for nanoscale devices. We investigated the formation of thin film alumina templates on various substrates, under different fabrication conditions. The final template structure was found to depend on the structure of the starting aluminum film (free standing or deposited on another substrate). We show that pre-anodization annealing of the substrate can dramatically alter the stoichiometry as well as the microstructure of the final template, changing it from amorphous to nanocrystalline.

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