Microstructure and Optical Properties of Layers Formed by Anodic Etching of Silicon

Stanislav Jurečka[1, a)] , Martin Králik[1, b)], and Emil Pinčík [2, c)]

[1] *Institute of Aurel Stodola, Faculty of Electrical Engineering and Information Technology, University of Žilina, Nálepku 1390, 03101 Liptovský Mikuláš, Slovak Republic.*
[2] *Institute of Physics, Slovak Academy of Sciences, Dúbravská cesta 9, 845 11 Bratislava, Slovak Republic.*

[a)]Corresponding author: stanislav.jurecka@feit.uniza.sk
[b)]martin.kralik@fel.uniza.sk
[b)]emil.pincik@savba.sk

Abstract. For various applications in optoelectronics and photovoltaics porous silicon structures are implemented for suppression of the spectral reflectance. We formed porous silicon structures by the anodic etching of p-type silicon substrates. Different etching conditions have been used in the forming procedure (electrical potential, current, and etching time) resulting in forming inhomogeneous structures with different microstructure and optical properties. The optical properties of formed structures are studied in our approach by application of the effective media approximation theory in construction of the spectral reflectance theoretical model. Thickness of formed layers, dielectric functions and volume fractions of structure components were extracted from optimized spectral reflectance model. Results of optical analysis correspond to the microstructure development during the sample forming.