

Optical Characteristics of Strontium Titanate Films Formed by Sol-Gel Method on Quartz Substrates

A. I. Kulak (Foreign) ¹,

H. Sohrabi Anaraki ²,

N. V. Gaponenko ³,

L. S. Khoroshko ⁴,

P. A. Kholov ⁵,

T. F. Raichyonok (Foreign) ⁶

2017

¹ Foreign (Institute of General and Inorganic Chemistry National Academy of Sciences of Belarus, Minsk, Belarus)

^{2, 3, 4, 5} Belarus State University of Informatics and Radioelectronics, Minsk, Belarus

⁶ Foreign (B. I. Stepanov Institute of Physics, National Academy of Sciences of Belarus, Minsk, Belarus)

Keywords: Sol-gel method, strontium titanate, optical transmission spectra, refractive index, band gap energy.

Abstract: The transmission spectra of films of strontium titanate up to 200 nm thick produced on quartz glass substrates by the sol-gel method were investigated in the region of 200–1100 nm. The sol was prepared from strontium acetate, titanium tetraisopropoxide, acetic acid, and

ethylene glycol monomethyl ether. The strontium titanate films were formed by successive deposition of five layers with intermediate drying of each layer and final heat treatment at temperatures in the range of 500–700°C. From analysis of the transmission spectra it was established that the obtained films are characterized by a wide forbidden band decreasing from 4.46 to 3.84 eV in the transition from x-ray amorphous films to crystalline films with refractive index of 1.996 ($\lambda = 620$ nm) due to the high packing density of up to 81.5% of that for monocrystalline strontium titanate.

Published in: Journal of Applied Spectroscopy, 2017. – Vol. 84, Issue 1. – P. 132-135. – <https://doi.org/10.1007/s10812-017-0439-x>.

Translated from Zhurnal Prikladnoi Spektroskopii, Vol. 84, No. 1, pp. 150–153, January–February, 2017.

Read More:

<https://link.springer.com/article/10.1007/s10812-017-0439-x>.

Copyright information: © Springer Science+Business Media New York 2017.