Nanooptics and photonics

Optical polarization sensors based on Zn_2SnO_4 nanofilms

M.O. Stetsenko[1], A.O. Salohub[2], L.S. Maksimenko[1], A.S. Opanasyuk[2]

[1] *V. Lashkaryov Institute of Semiconductor Physics, National Academy, Kyiv, Ukraine. Prospect Nauki, 45, Kiev-03029, Ukraine.*
E-mail: StetsenkoMax@gmail.com

[2] *Sumy State University, 2, Rymskogo-Korsakova St., 40007 Sumy, Ukraine.*
E-mail: annkasalohub@gmail.com

Zn_2SnO_4 nanofilms is a well-known highly leading and transparent oxide, which has much application as solar cells and sensors. This class of materials is promising in gas sensorics [1].

The using of layers of metal oxides in electronics were stimulated by searching of low-cost vacuum methods for their deposition.
Such technologies include the method of spray-pyrolysis. Zn_2SnO_4 nanofilms using this method were deposited on glass substrates [2].

Using the modulation polarimetry technique [3] it was proposed Zn_2SnO_4 nanofilms as sensor chip for registering of the polarization difference parameter ρ (Q-components of the Stokes vector) in the Kretchman geometry. The reflection coefficients of s-, p - polarized radiation and the parameter ρ have been simulated for the case of a multilayer structure using the transfer matrices for corresponding layers. The three-layer system: quartz, Zn_2SnO_4 layer, detectable environment was used. The simulation was performed for the gaseous and liquid media that are investigated. The influence of substrate temperature at the deposit films process and corresponding changes of refractive index on sensitivity to small changes of quantity detectable environment were analyzed.

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