DMITRIEV, S., NIKA, D., POKATILOV, E. Nanodimensional Chalcogenide Film-Metal Structure: Numerical Modeling of the Gas Sensitive Properties. In: Journal of Nanoelectronics and Optoelectronics. 2009, Vol..4, nr.1, pp. 165-169. ISSN 1555-130X.

Paper presents results of the numerical simulation of the gas sensitive device on the basis of chalcogenide (Ch) semiconducting nanodimensional film (NDF). Considered model device had been included also underlying electrode and two top coplanar electrodes. The developed theoretical model has been applied for the consideration of chalcogenide (As_2S_3, As_2Se_3 and their solid solutions) NDF surface interaction with gaseous species. Performed numerical modeling has allowed to estimating the hole's potential distribution in the NDF and film's gas sensitivity as function of its basic electrophysical parameters (thickness, hole concentration, dielectric permittivity) and gas molecules surface concentration. It was shown, first of all, that considered materials can possess sufficient gas sensitivity already at room temperature. The second interesting result is connected with the presence of the maximum on the gas sensitivity versus thickness dependence and its position strong dependence on the hole concentration in NDF. Also modeling results have shown the significant influence of dielectric permittivity value on the magnitude of gas sensitivity. The proposed model is expected to be successfully used for estimation and optimization of gas sensitive devices on the basis of chalcogenide NDF.