

THERMOCHROMIC PROPERTIES OF VANADIUM  
DIOXIDE FILMS OBTAINED BY MAGNETRON  
SPUTTERING

*V.P. Melnik, I.M. Khatsevych, Yu.V. Goltvyanskyi,  
V.A. Nikirin, B.M. Romanyuk, V.G. Popov,  
V.P. Klad'ko, A.V. Kuchuk*

V. Lashkaryov Institute of Semiconductor Physics,  
Nat. Acad. of Sci. of Ukraine,  
(45, *Prosp. Nauky, Kyiv 03028, Ukraine;*  
*e-mail: romb@isp.kiev.ua*)

S u m m a r y

The structural, electrophysical, and optical properties of thermochromic VO<sub>2</sub> films prepared by magnetron sputtering are investigated. It is shown that the thermochromic properties of VO<sub>2</sub> films can be improved in the case of their two-stage formation: sputtering at a substrate temperature of 200 °C followed by thermal annealing. The data of experimental studies confirm the formation of VO<sub>2</sub> crystallites with a mean size of 26 nm and a monoclinic crystal lattice in the investigated films. At the phase transition, the change of the film conductivity reaches 3 orders of magnitude, while the optical transmission (at the probing light wavelength  $\lambda = 2 \mu\text{m}$ ) changes by a factor of 16. It is shown that the variation of annealing parameters of the synthesized films allows one to change their thermochromic properties. The obtained results are explained in the framework of the model of formation of VO<sub>2</sub> nano-inclusions.