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Vanadium dioxide based on nano-devices for photonic apllications

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<p>Vanadium dioxide falls into the category of smart thermochromic materials, one where the property of the material changes due to the effect of temperature. High quality pure thermochromic thin films of vanadium dioxide were prepared by using two physical methods, Rf-reactive sputtering and pulsed laser deposition methods. These deposition methods were used to study the effect of deposition temperature on vanadium dioxide thin films microstructure, electrical and optical properties. The deposition conditions (oxygen pressure, substrate-target distance, substrate temperature and etc) on both methods were carefully optimized for the quality of VO2 thin films on a glass substrate, with a substrate temperature ranging from 350-600 degrees celcius. All the vo2 thin films prepared by Pulse laser deposition technique and Rf- reactive sputtering were characterized by X-ray diffraction technique, observed to be crystallized showing the first peak at 27.87 degrees celcius which corresponds to the (011) plane and the monoclinic structure of VO2. This peak indicates the existence of Vanadium dioxide. Thermochromic properties of VO2 thin films were investigated by measuring the optical and electrical properties below and above the critical temperature using the UV/VIS technique. T he atomic force microscopy was also used to investigate the surface roughness of all the VO2 thin films. RBS was used for quantitative analysis of composition, thickness and depth profiles of VO2 thin films and it was conducted using a 2 MeV beam of alpha particles, other techniques as well as TEM, SEM, FTIR were also employed to investigate the morphology, composition, and crystallographic information on VO2 thin films.

Level (Hons, MSc,
   PhD, other)?

msc

Consider for a student
   award (Yes / No)?

yes

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

no

Primary author: Mr MADIBA, itani given (university of western cape)

Presenter: Mr MADIBA, itani given (university of western cape)

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