

# Production of VO<sub>x</sub> thin films by RF Reactive Magnetron Sputtering

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Thin films of vanadium oxide (VO<sub>x</sub>) are used as thermosensing material in detectors of electromagnetic radiation in the infrared spectral range. In this work VO<sub>x</sub> thin films were deposited on glass substrates by RF Reactive Magnetron Sputtering, using a vanadium target of 99.5% purity in an atmosphere composed of argon and oxygen at temperatures range 200-400°C.

The depositions were divided into three series according to the temperature of the substrate. In each series the content of O<sub>2</sub> ranging from 1.48 to 1.75% of the gas admitted to the chamber. The deposition parameters such as power, pressure and target-substrate distance were kept constant at 130 W, 10 mTorr and 55 mm respectively.

The TCR (coefficient of variation of resistance with temperature) of samples was obtained by a system of electrical characterization of two points under vacuum made especially for this purpose. The samples were also characterized for crystallinity in a diffractometer model X'Pert PRO PANalytical (K $\alpha$ Cu = 1.54184 Å) and thickness on a Dektak profilometer model 150 from Veeco.

The produced samples showed different colors depending on the content of O<sub>2</sub> in the atmosphere deposition. Were obtained films metallic, dark, dark brown, brown and yellow, with thicknesses between 700 and 3570 Å. The films with a metallic or yellow color were amorphous or nanocrystalline, while the films with dark brown or brown color were composed of VO<sub>2</sub> and V<sub>4</sub>O<sub>9</sub> phases.

Irrespective of the deposition parameters used, the temperature coefficient resistance (TCR) of samples of metallic color had a TCR below of -0.346%/K, while the other stains showed TCR's high, reaching -3.719%/K for the brown color.

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