

## Accepted Manuscript

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PII: S0257-8972(16)31358-5  
DOI: doi: [10.1016/j.surfcoat.2016.12.070](https://doi.org/10.1016/j.surfcoat.2016.12.070)  
Reference: SCT 21927  
To appear in: *Surface & Coatings Technology*  
Received date: 17 August 2016  
Revised date: 16 December 2016  
Accepted date: 19 December 2016

Please cite this article as: Wangwei Lu, Gaoling Zhao, Bin Song, Jin Li, Xinwen Zhang, Gaorong Han , Preparation and thermochromic properties of sol-gel-derived Zr-doped VO<sub>2</sub> films. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2016), doi: [10.1016/j.surfcoat.2016.12.070](https://doi.org/10.1016/j.surfcoat.2016.12.070)

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**Preparation and thermochromic properties of sol-gel-derived Zr-doped VO<sub>2</sub> films**

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**Abstract**

Vanadium dioxide (VO<sub>2</sub>) films were prepared on the glass substrates with a sol-gel process using polyvinyl pyrrolidone as a crosslinking agent. Zirconium ions were doped to decrease the phase transition temperature of VO<sub>2</sub> films. X-ray diffraction, electrical resistance and optical transmittance spectra were measured to study the microstructure and thermochromic properties of Zr-doped VO<sub>2</sub> films. The XRD peaks of Zr-doped VO<sub>2</sub> shifted towards small angles as the amount of zirconium increased, indicating an enlargement of lattice constants, which can be attributed to the larger radius of Zr<sup>4+</sup> ions. The phase transition temperature of VO<sub>2</sub> film reduced with increasing Zr<sup>4+</sup> doping amount. When the amount of Zr<sup>4+</sup> increased up to 2 wt %, the critical temperature of phase transition decreased to 50 °C while the visible optical transmissivity almost remained the same.

**Key words:** Vanadium dioxide film; Zirconium ion doping; Thermochromic; Critical temperature

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