

# TiO<sub>2</sub> doped with nickel thin films Properties

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**Abstract :** Thin films of un-doped and Ni-doped TiO<sub>2</sub> were synthesized by the sol-gel dip-coating technique and deposited on glass substrates, for different annealing temperatures (from 400 °C to 500 °C). The X-rays diffraction and Raman show the formation of anatase phase, we also notice that doping with Ni influence the intensity of anatase peaks and decreases of grain sizes (from 24.3 to 15.23 nm). The nanostructure Ni-doped TiO<sub>2</sub> thin films was observed AFM, which shows that the elaborated films are smooth and dense with Rms values of about 3 nm. The calculate values of refractive index of thin films increases from 2.22 to 2.38, and reduction in transmittance and band gap with the increase in the nickel concentration. Vibrating sample magnetometer results of un-doped TiO<sub>2</sub> thin films reveal a ferromagnetic behavior at room temperature with  $M_s = 0.67 \cdot 10^{-4}$  emu and low content of nickel doping leads to an enhancement of the saturated magnetic moment  $M_s = 1.11 \cdot 10^{-3}$  emu.

**Keywords :** Ni-doped TiO<sub>2</sub>, sol-gel, Thin films, TiO<sub>2</sub> properties