

Study of structural properties of thin films of TiO₂ doped Ni obtained by Sol-gel method

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Abstract : The objectives through this work, is the study of the structural properties of the thin films of titanium dioxide obtained by dip-coating. Holding in account the effect of nickel on these properties. The properties of the thin films of TiO₂ strongly depend on the microstructures obtained. Those are modulated by the technique and the conditions of preparation, as well as by the heat treatments on the one hand [1]. And in other hand by the effect of impurities [2]. In this work, we are interested in the study of the structural properties of the thin films of TiO₂ un-doped and doped Ni obtained by sol-gel method. For that we study the evolution of the grains size, the crystalline structure with the temperature of treatment, the number of dipping and the concentration of doping 2% and 5% nickel. Our results show that the structure and the grains size of our layers change when one varies the temperature of treatment as well as the number of steeping and the concentration of nickel doping, more the nickel rate is large plus the structure is fine, this is led to the variation of the index of refraction, of the grains size, the gap, the transmittance and the temperature of crystallization. We used several techniques of investigation to follow the structural evolutions and their structural properties resulting from various heat treatments, various dipping and different Ni concentration: Differential calorimetric analysis (DSC), diffraction of the rays X (XRD), UV-visible Spectroscopy, scanning electronic microscopy (SEM).

Keywords : sol-gel process, TiO₂ doped Ni, Structural properties