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The influence of annealing temperature and mercury doping (Hg) on nanostructures thin films of TiO₂ obtained by sol-gel method

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Abstract : This work is a study of Hg⁺² doped TiO thin films deposited on silicon substrates prepared by sol-gel method and treated at temperature ranging between 600 to 1000 ° C for 2 hours. The structural and optical properties of thin films have been studied using different techniques. We analyzed vibrations of chemical bands by Fourier transform infrared (FTIR) and optical properties by UV-Visible spectrophotometer (reflection mode) and photoluminescence (PL). The X-ray diffraction and Raman spectra of TiO thin film, confirm the crystallization of the structure on anatase, rutile and mercury titanate oxide (HgTiO) as function of the annealing temperature. The observation by scanning electron microscopy (SEM) shows the changing morphology of nanostructures with annealing temperature. The photoluminescence and reflectance spectra indicate that these structures should enhance display photocatalytic activity. 22

Keywords : TiO₂ -Hg, sol-gel, Structural properties, nanostructures, nanotubes, Optical properties.