

## STUDY OF PT DOPANT EFFECT ON PHOTOCATALYTIC ACTIVITY OF TiO<sub>2</sub> THIN FILMS SUBJECTED TO TENSILE FRAGMENTATION TESTS

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### Abstract

Pure and Pt-doped TiO<sub>2</sub> thin films were deposited on polyethylene terephthalate (PET) substrates by means of d.c reactive magnetron sputtering at low temperature and under a constant total sputtering pressure of 0.4 Pa. The structure of films were analysed by X-ray diffraction (XRD). Different platinum concentrations were used in order to study the Pt-doping effect on TiO<sub>2</sub> photocatalytic activity. Moreover, some samples were deposited with pure TiO<sub>2</sub> films and subsequently subjected to a tensile fragmentation test in order to study the influence of TiO<sub>2</sub> film cracking on photocatalytic activity. The photocatalytic activity was evaluated by measuring the degradation rates of rhodamine-B (RhB) dye under ultraviolet irradiation (UV). The experimental results revealed an optimum concentration of Pt-dopant concerning with its ability in increasing the catalytic efficiency of TiO<sub>2</sub> on RhB photo-decomposition. Concerning with mechanical fragmentation test, it was found that films with higher crack density becomes more photocatalytic efficient.

**Keywords:** Titanium dioxide, photocatalytic activity, Pt-doping effect, film cracking