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## Influence of aged sol and annealing temperature on the physical properties of super-hydrophobic TiO<sub>2</sub> thin films

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TiO<sub>2</sub> thin films have a variety of applications, including electro-chromic displays, dye-sensitized solar cells, gas sensors, antireflection films, planar wave guides and optical filters. It also has environmental applications, being extensively used in the photo degradation of organic and inorganic pollutants, photovoltaic energy production and the production of hydrogen by water photo splitting. TiO<sub>2</sub> is currently the leading photocatalyst because it can mineralize a large range of organic pollutants. However, owing to its large band gap energy (typically <380 nm), TiO<sub>2</sub> can only absorb ultraviolet light but not visible light, which constitutes a proportion of solar light. The overall quantum yield rate can be influenced by the low rate of electron transfer to dissolved oxygen and a high rate of recombination between electron-hole pairs. The preparation of TiO<sub>2</sub> thin films has received great attention because of its remarkable optical, photocatalytic and electrical properties. TiO<sub>2</sub> thin films have been prepared by several techniques. In general, sol-gel methods are more flexible and offer many advantages. In this study, TiO<sub>2</sub> thin films were prepared by the sol-gel method using the spin-coating technique because, nanocrystalline materials have tremendous impact on various recent developments in industry and science. The annealing temperature plays an important role during the crystalline process. The influence of the aged sol and annealing temperature on the physical properties of TiO<sub>2</sub> thin films were investigated in this study.

### Recent Publications

1. Su-Shia Lin, Chung-Sheng Liao, Sheng-You Fan, (2015), "Effects of substrate temperature on properties of HfO<sub>2</sub>, Al and HfO<sub>2</sub>:W films", *Surface & Coatings Technology*, 271:269-275.
2. Su-Shia Lin, Yung-Shiang Tsai, Kai-Ren Bai, (2016), "Structural and physical properties of tin oxide thin films for optoelectronic applications", *Applied Surface Science*, 380:203-209.
3. Su-Shia Lin, Chung-Sheng Liao, (2016), "Effects of the ratio of O<sub>2</sub>/Ar pressure on wettability and optical properties of HfO<sub>2</sub> films before and after doping with Al", *Applied Surface Science*, 380:229-236.
4. Su-Shia Lin, Sheng-You Fan, Yung-Shiang Tsai, (2017), "Effects of annealing on wettability and physical properties of SnO thin films deposited at low RF power densities", *Ceramics International*, 43:1802-1808.
5. Su-Shia Lin, Chung-Kai Peng, Cho-Wei Li, (2019), "Wettability and optical properties of SnO-SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>3</sub> thin films deposited by simultaneous RF and DC magnetron sputtering", *Journal of Alloys and Compounds*, 770:433-440.

### Biography

Su-Shia Lin is Professor at Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University, Taiwan. She has some research experiences in materials science. Her research work mainly focuses on electrical and optical films, optical memory and optical data storage, nanometer materials and optical design.

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