## Sol-gel Synthesis and Bifunctional Properties of TiO<sub>2</sub>/SnO<sub>2</sub> Composite Nanopowders

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**Abstract** Uniform TiO<sub>2</sub>/SnO<sub>2</sub> composite nanopowders with different Ti/Sn molar ratio have been successfully prepared via the sol-gel route. The samples were characterized using X-ray diffraction (XRD), thermogravimetric and differential thermal analysis (TG-DTA), transmission electron microscopy (TEM) and infrared spectrum (IR). The crystal size of the as-synthesized TiO<sub>2</sub>/SnO<sub>2</sub> nanopowders is about 80 nm according to the XRD calculation. XRD analysis shows that the diffraction peaks associated with SnO<sub>2</sub> can't be found in XRD patterns when the molar ratio of TiO<sub>2</sub>/SnO<sub>2</sub> is less than 10/1. The photocatalytic degradation of methyl orange (MeO) in TiO<sub>2</sub>/SnO<sub>2</sub> suspension was investigated. The results indicate that the TiO<sub>2</sub>/SnO<sub>2</sub> is 10/1, but it will remarkably decrease with TiO<sub>2</sub>/SnO<sub>2</sub> molar ratio of 1/1. The photocatalytic mechanism of TiO<sub>2</sub>/SnO<sub>2</sub> nanopowders was discussed. In addition, the electric property of TiO<sub>2</sub>/SnO<sub>2</sub> nanopowders with Ti/Sn molar ratio of 1/10 shows a resistivity of  $1.4 \times 10^3 \Omega \cdot cm$ . The TiO<sub>2</sub>/SnO<sub>2</sub> nanopowders indicate a potential application in photocatalytic and electronic materials based on its bifunctional characteristics.

**Keywords:** TiO<sub>2</sub>/SnO<sub>2</sub> nanocomposites; Sol-gel synthesis; Photocatalysis; Electrical property; Bifunctional characteristics.

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## References

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