## **Electro-photocatalytic Fenton Decolorization of Orange G Using Mesoporous TiO<sub>2</sub>/stainless Steel Mesh Photo-Electrode Prepared by the Sol-Gel Dip-Coating Method**

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A photo-electrochemical process is a powerful and eco-friendly method for treating industrial wastewater. Electro-photocatalytic Fenton (EPF) was employed for orange G decolorization using two kinds of photo-electrodes with TiO<sub>2</sub> film-coated stainless steel (SS) mesh. These photo-electrodes are prepared by a dip-coating method from the sol-gel-derived TiO<sub>2</sub> sols incorporating with various amounts of P25+TiO<sub>2</sub> powders (SGDC method). The single dip-coated electrode with the TiO<sub>2</sub> sol containing 50 g/L P25 powders possesses similar crystallinity and decolorization performance to the four repetitive dip-coated electrodes with pure TiO<sub>2</sub> sol. The kinetics of orange G decolorization using P25+TiO<sub>2</sub> film electrode in photocatalytic (PC), electro-Fenton (EF) and EPF processes followed pseudo first-order kinetics model, and the EPF has the highest reaction rate. The efficiency of orange G decolorization achieves 78% via the EPF reaction for 3 h. The SGDC method using the TiO<sub>2</sub> sol containing P25 powders not only enhances the TiO<sub>2</sub> coating on the SS substrate, but also produces microcracks in the film, that facilitates the in-situ generation of ferrous ions and further induces the EPF reaction for an effective degradation of organic matter in wastewater.

**Keywords:** Sol-gel dip-coating (SGDC); P25 TiO<sub>2</sub>; mesoporous film; electro-photocatalytic Fenton (EPF)

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