Synthesis of TiO₂ using sol–gel method and comparison of photocatalytic characteristics

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The aim of the present communication is to compare the physical and chemical properties of TiO₂ powder and TiO₂ coated thin film particularly the photochemical degradation of pollutants. TiO₂ Powder was synthesized by the sol–gel method and was annealed with the temperatures ranging from 300 to 1100°C. TiO₂ coating, about 8 µm thin film, was successfully fabricated by the sol–gel dip process on borosilicate glass used as a substrate having a surface area of 100 mm² and was further annealed at the same temperatures 300–1100°C. TiO₂ films and powder which were annealed at 300°C for 2 h have the structure of anatase and the particle phase composition was mainly dependent to the annealing temperature which was found to be changed from amorphous to crystalline anatase and rutile by increasing the temperature. These results were demonstrated based on the X-ray diffraction, SEM and UV–visible spectroscopic data. Further, the photocatalytic characteristics of the synthesized powder and film showed that the TiO₂ powder possessed better photocatalytic behavior than the thin film employed.

Keywords: Anatase; Photocatalytic; Amorphous; Titanium oxide

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