

Synthesis and Photocatalytic Characterization of (Ta,N) Doped TiO₂ with Unique Morphology by WCRSP Process

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Abstract: Recently, environmental friendly solvothermal synthesis process has become a promising method for material synthesis because of the possibility for producing nanosize crystals with soft agglomeration, and controllable phase composition or morphology. By controlling the parameters of the reaction, it is possible to produce anhydrous crystalline powders with controlled particle size, controlled stoichiometry, or controlled particle morphologies. In this present talk, the synthesise of mixed ions doped titania particles with unique morphologies by a novel “Water Controlled-Release Solvothermal Process (WCRSP)^[1-2]” will be introduced. In a typical synthesis, potassium titanate with fibrous morphology was utilized as precursor. After ion exchange in hydrochloric acid solution, protonic titanate with similar fibrous morphology was obtained. Mixed ions such as niobium and nitrogen were successfully doped by introducing metallic ions during the precursor formation and the nitrogen doping treatment using urea as nitrogen source. Compare with conventional synthesis method, it was found that the WCRSP process resulted to very unique superstructure of the surface on fibrous titania, which possessed very high specific surface area and excellent deNO_x photocatalytic activity. It is expected that the WCRSP process might be an effective method for the synthesis of various inorganic functional materials with controllable morphologies and particle size.

References:

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