

Synthesis of Shape-controlled Bi_2WO_6 Particles using Unconventional Precursors with Ultrasonic Spray Pyrolysis

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Ultrasonic spray pyrolysis (USP) is an aerosol technique that can produce fine, non-agglomerated powders through the nebulization of a precursor solution, followed by thermal decomposition of the dissolved species. The control of product morphologies has been achieved through variation of selected precursors for the synthesis of Bi_2WO_6 via USP. The use of conventional precursors resulted in a typical USP product of polycrystalline spheres, while the use of precursors that yield non-transient byproducts resulted in the first example of shape-controlled particles synthesized using USP. Insight into their mechanisms of formation were assessed by differential scanning calorimetry and thermal gravimetric analysis of the various precursor combinations, which indicate that the different decomposition pathways and generated byproducts account for the varying particle structures. These products were also evaluated as photocatalysts for the degradation of rhodamine B and compared to Bi_2WO_6 prepared by solid-state heating of the parent oxides.

