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BiVO₄ and WO₃ nanophotocatalysts: Water-splitting and environmental applications

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Water splitting and photocatalytic degradation of organic pollutants are promising reactions for solving fundamental energy and green issues. The search for suitable semiconductors as photocatalysts for the splitting of water into hydrogen gas using solar energy is one of the noble missions of material science. An optimal material would combine an ability to dissociate the water molecules, having a band gap that absorbs light in the visible range and to remain stable in contact with water. Among semiconductors, BiVO₄ and WO₃ have attracted considerable interest in recent years due to small band gap, stable physicochemical properties, resilience to photo-corrosion effects and significant incident photo-to current conversion efficiencies. m-BiVO₄ and WO₃ nanoparticles as photocatalysts for H₂ evolution, which works under UV-light irradiation, have been synthesized by a facile solution combustion synthesis method. The estimated band gap of BiVO₄ and WO₃ particles are ~2.52 eV and ~2.845 eV respectively. The yields of hydrogen generated are ~489 μ mol ~457 μ mol per 2.5 h for BiVO₄ and WO₃ as photocatalysts of reactions under UV irradiation. The BiVO₄ and WO₃ powders show highly visible photocatalytic activity towards methylene blue degradation under sun light irradiation. The H₂ evolution and photocatalytic activity of BiVO₄ and WO₃ powders can be attributed to their physical properties such as nanosized particles and large surface area.

Biography

G T Chandrappa has completed his MSc and PhD degrees from University of Mysore. He worked as Post-doc with Prof. K. C. Patil, Bangalore, well known combustion Scientist. He was then introduced to nanomaterials during his Post-doctoral tenure with Prof. Jacques Livage at Universite Paris, France, and published a novel material V₂O₅ in a reputed journal *Nature*. He is the recipient of MRSI medal for the year 2015. He is in credit of two patents and 95 research publications in international/national journals. Eight PhD's were awarded and six more are working under his guidance. His research has been supported financially by Indian Government granting several research projects.

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