



Black TiO₂ Nanomaterials: Discovery & Beyond

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Abstract:

Titanium dioxide (TiO₂) has been widely used for renewable energy applications such as photocatalytic hydrogen generation, photocatalytic CO₂ conversion, and photocatalytic environmental cleanings. Its ability to absorb sunlight plays a key role in the overall efficiency for these applications. However, it is a white material, with a large bandgap, and only absorbs light in the ultraviolet (UV) region. This limits its overall efficiency as the UV light only accounts for less than 5% of the whole solar spectrum. Here, I would like to introduce our work on how to turn white titanium dioxide into black, in order to improve its efficiency in renewable energy applications. The fundamental materials and physiochemical characterizations will be discussed in details. In addition, their applications in lithium-ion rechargeable battery and microwave absorption will be introduced, along with other recent work.

Biography



Xiaobo Chen is an Associate Professor at the Department of Chemistry, University of Missouri Kansas City. He obtained his Ph.D. from Case Western Reserve University in 2005, and then worked at University of California - Berkeley from 2006 to 2011. His research interests include nanomaterials synthesis, characterization, modifications, and applications in renewable energies, such as photocatalysis, battery, electrochemistry, microwave absorption and environmental pollution removal. His renowned work includes the discovery of black TiO₂ nanoparticles and their related applications. He has published around 150 peer-reviewed articles with over 39,000 citations.