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Catalytic water purification driven by solar energy: Fundamental understanding and novel materials

Catalytic decontamination of water by solar energy has attracted substantial interest over the past decades. However, to develop an efficient photocatalyst for such environmental purification, in particular water treatment still remains a big challenge, involving Material Science, Chemistry, Engineering and Physics. In particular, there is not a cost-effective way to deal with large volume of water contaminated by small amount of organic substance or extreme large amount of contaminated water in suburban region (e.g. oil spill in Mexico Gulf, in China Bohai Sea). Inorganic photocatalysis using solar energy to mineralize organic contaminants in principal is the potentially best solution to these issues and works in the cost-effective way. Recently, we preliminarily illustrated the key factors dominating the efficiency of process driven by light irradiation. Following that, water treatment was carried out in my group which is a challenging topic due to its complexity. In this talk, the mechanism of the chemical process, involving charge transfer and reaction with oxygen, will be addressed and structured/junction material development will be presented, resulting into a few times higher activity for textile water treatment and simulated river water treatment compared with the benchmark photocatalyst P25. Furthermore, a new and facile method to synthesize these active photocatalysts will be discussed.

Biography

Junwang Tang is the Director of UCL Materials Hub, Professor of Chemistry and Materials Engineering in the Department of Chemical Engineering, and a Fellow of the RSC. He has received his PhD in Physical Chemistry in 2001. After taking a JSPS Fellowship in Japan he became Senior Researcher in Imperial College London. Later, he has joined the Department of Chemical Engineering at University College London to take a Permanent Faculty position. He currently leads a research team including postdoctoral researchers, academic visitors and research students with financial support from UK EPSRC, Leverhulme, Royal Society, Royal Academy of Engineering, Newton Fund, EU PF7, Qatar and so on.

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