

Fabrication of Nanomaterials for Energy and Environmental Applications



Professor Jimmy C. YU

Dept. of Chemistry and Environmental Science Programme
The Chinese University of Hong Kong

Abstract

Energy and environment are the biggest challenges of the 21st century. It is ironic that such big problems may be solved by something very small. Nanomaterials, with attractive chemical and physical properties, are being explored for their potential in energy and environmental applications. For example, when nanosized anatase TiO₂ is illuminated by UV, it triggers an energetic response that can split water molecules to form hydrogen gas and oxidize pollutants to environmentally acceptable products. Pure titanium dioxide powders, however, have poor quantum efficiency and are difficult to recycle. The development of more effective and easily recyclable photocatalysts is therefore crucial. Several strategies for photocatalytic activity enhancement, including noble metal sensitization, non-metal doping, and the inclusion of mesopores have been developed. The preparation methods for enhanced TiO₂-based photocatalysts as well as other semiconductor oxides and chalcogenides will be described. The uses of these nanomaterials will be discussed in this presentation.

Biography of Speaker

Prof. Jimmy Chai-mei Yu (余濟美) received his Ph.D. degree in Environmental Analytical Chemistry from University of Idaho. He joined the Department of Chemistry in 1995 after teaching for over ten years in the United States. He is now Professor and Director of Studies of the Environmental Science Programme at CUHK. Prof. Yu's research interests focus on nanomaterials and their environmental applications. He has received prestigious research awards and holds several patents for his inventions.

References

1. J.G. Yu, J.C. Yu, W.K. Ho, L. Wu, X.C. Wang, *J. Am. Chem. Soc.* **126**, 3422 (2004).
2. L.Z. Zhang, J.C. Yu, M.S. Mo, L. Wu, Q. Li, K.W. Kwong, *J. Am. Chem. Soc.* **126**, 8116 (2004).
3. J.C. Yu, X.C. Wang, L. Wu, W.K. Ho, L.Z. Zhang, G.T. Zhou, *Adv. Funct. Mater.* **14**, 1178 (2004).
4. X.C. Wang, J.C. Yu, Y.D. Hou, X.Z. Fu, *Adv. Mater.* **17**, 99 (2005).
5. M.S. Mo, J.C. Yu, L.Z. Zhang, S.K.A. Li, *Adv. Mater.* **17**, 756 (2005).
6. J.C. Yu, W.K. Ho, J.G. Yu, H.Y. Yip, P.K. Wong, J.C. Zhao, *Environ. Sci. Technol.* **39**, 1175 (2005).

7. X.C. Wang, J.C. Yu, Y.L. Chen, L. Wu, X.Z. Fu, *Environ. Sci. Technol.* *40*, 2369 (2006).
8. F.Q. Sun, J.C. Yu, *Angew. Chem. Int. Ed.* *46*, 773 (2007).
9. X.L. Hu, J.C. Yu, J.M. Gong, Q. Li, G.S. Li, *Adv. Mater.* *19*, 2324 (2007).
10. X.L. Hu, J.C. Yu, *Adv. Funct. Mater.* *18*, 1 (2008).