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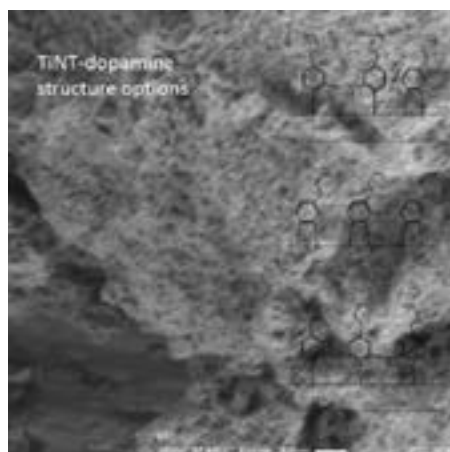
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Surface functionalization and analysis of nanomaterials towards modification of their properties

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Photo-catalyst materials which are suitably stable often have large band gaps, and can only be activated by UV light. Surface functionalization by organic molecules is a mild, efficient and green method to alter the photo-catalytic activity of semiconductors. Our recent research has involved the synthesis and modification of novel inorganic nanostructured materials in order to exploit their properties in visible light active photocatalytic systems. We have shown that self-assembled surface modification by organic molecules imparts titania nanotubes with stable, recyclable photocatalytic activity under visible light illumination. Using solid state NMR, XRD and Mass spectroscopy, we have recently been looking into the arrangement of the organic molecules on the nanotube surface. Surface Enhanced Raman Scattering (SERS) is a powerful analytical technique for chemical sensing of trace amounts of analyte, providing in-depth structural information. Once the molecule has been analyzed, in order to be reused, the surface molecule must be removed. Self-cleaning under UV or visible light is a promising method for this. We have incorporated photo-catalytically active titania nanotubes with high surface area together with silver nanoparticles, rendering it SERS active, thus creating a self-regenerating SERS active nanocomposite material.



Biography

Graham Dawson is currently a Lecturer at Xi'an Jiaotong Liverpool University, Suzhou China, joining in March 2013. Before taking this position he worked at the Suzhou Institute of Nanotechnology and Nanobionics (SINANO) as a Post-doctoral Research Assistant then as an Associate Professor. During this time, he was Principal Investigator of several provincial and national level projects. He completed his PhD studies under Professor Wuzong Zhou at the University of St. Andrews, Scotland and has presented his research at several national and international conferences and published papers in peer reviewed international journals. His research interests are in the area of nanomaterial synthesis towards applications in photocatalytic degradation and water splitting.

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