Conversion of lignin to high value chemicals via photocatalytic conversion

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Conversions of biomass wastes to be value-added materials or chemicals have been recently researched. One of the challenges is the utilization of biomass wastes to modify photocatalysts. In this work, lignin, a biomass waste, was used to modify titanium dioxide (TiO2) photocatalyst via sol-gel microwave technique with sintering. Effects of lignin-based carbon modification were investigated on their morphology (by field emission scanning electron microscopy (FE-SEM) and high-resolution transmission electron microscopy (HRTEM)), crystal structure (by X-ray diffraction (XRD)), surface structure (by Fourier transform infrared spectroscopy (FT-IR) and N2 adsorption), optical properties (by UV-visible diffuse reflectance spectroscopy (UV-vis DRS) and photoluminescence (PL)) and photocatalytic activity. It should be noted that, in this work, lignin was not only used as a carbon source for TiO2 modification, but it was also used as a biomass resource for chemical production. Enhanced photocatalytic performance of TiO2 by lignin-based carbon was investigated from conversion of lignin to high-value chemicals. It was found that lignin-based carbon could improve photocatalytic performance of photocatalysts compared with the pristine TiO2. Vanillin and other high value chemicals were found after photocatalytic conversion of lignin.

Biography

Surawut Chuangchote has completed his BEng in Petrochemical and Polymeric Materials Engineering in 2004. He has completed his MSc in Polymer Science from Silpakorn University and Chulalongkorn University, respectively in 2006. He has completed his PhD in Energy Science from Kyoto University, Japan in 2009. He is an Assistant Professor in the Department of Tool and Materials Engineering, Faculty of Engineering, KMUTT. He has published more than 40 papers in the international journals and books and received a number of awards. His research interests focus in development of advanced nanomaterials for energy applications, emerging solar cells, photocatalysts for energy, environment and green chemicals/materials from biomass.

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