

Solar Photocatalysis for Hydrogen Power and Fuel Cell

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Abstract

Solar photocatalysis is a promising approach to achieve production of renewable hydrogen fuel for future sustainable energy. Photocatalysis (PC) can also be integrated with fuel cell (FC) to form photocatalytic fuel cell (PFC) that effectively utilizes solar energy for simultaneous wastewater treatment and recovery of energy chemically stored in wastewater. PFC using photoanode and photocathode can utilize solar energy effectively for hydrogen production, carbon reduction, wastewater treatment and recovery of the energy chemically stored in wastewater. Solar PC can decompose organic compounds while the FC component provides an electrical potential bias to drive the transport of the photogenerated electrons. In this talk, the speaker will first discuss the properties and fundamental mechanisms of solar photocatalysis followed by the development of effective visible-light activated nano-photocatalysts. Then, different reactor configurations, designs and control strategies for various applications will be presented. The talk will also cover upcoming R&D challenges for enhancing the solar photo catalysis technologies.

Biography:

Prof. Michael LEUNG's research areas include solar photo catalysis, fuel cell and advanced air-conditioning. His research emphasizes the development of modified nanostructured materials to perform various functional photo electrochemical activities. He has also developed photo catalytic fuel cell reactors by integration of photo catalytic and electrochemical systems to achieve simultaneous waste water treatment and generation of free electricity. His research works are impactful and have received international recognition as he is recently listed as a Highly Cited Researcher by Clarivate Analytics in 2018. He is also listed as a Most Cited Scholar in Energy Science and Engineering by Shanghai Ranking Consultancy in collaboration with Elsevier. Prof. LEUNG has received total HK\$40M+ research grants as a PI from NSFC, ITF, RGC, ECF, SDF, industrial sponsorships, university internal grants, donations, etc. He has published 150+ journal papers, 80+ conference papers, 15 books/ book chapters, and 7 patents.