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Enhance piezophototronic photocatalytic activity of ZnO nanorods embedded on flexible PDMS sheet

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In this paper, we generate piezoelectricity in one-directionally aligned bi-axially grown ZnO nanorods. The applied force is horizontal to the polarization direction. The piezo-phototronic induced voltage generated from a bending radius is experimentally measured for ZnO NRs. The combination of the photocatalytic effect and piezoelectrochemical phenomenon of ZnO NRs has been used for the degradation of an organic pollutant in the aqueous medium. The mechanical stress creates a polar charge field on the surface of ZnO NRs, which acts as a driving force to enhance the charge separation of photogenerated electron and hole pairs. Subsequently, the charge separation increases the photocatalytic activity of ZnO NRs. Further, coumarin (COU), used as a fluorescent probe for the purpose of detection and measurement of OH. radical is generated during photocatalysis process. The synergistic effect of strain-induced chemical reactions and UV photocatalytic activity can deliver a lucrative approach for degradation of organic pollutants. In addition, this work exhibits an exciting new model of a piezo-phototronic device.

Biography

Mrinmoy Misra is an Assistant Professor at the Department of Bionano Technology, Gachon University, South Korea. He graduated with a Ph.D. from Academy of Scientific & Innovative Research, India. He has received awards such as Indian Institute of Technology Kanpur postdoctoral fellowship, 2015, Award of science & engineering research board (SERB) National Post-Doctoral fellowship, 2016. His research interests include thin-film fabrication, nanomaterial-based sensor, photocatalytic materials, nanoparticle synthesis and characterization and solar cells. Dr. Misra has authored 13 research articles in SCI journals.

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