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In corporation of graphene on ZnO nanorods as piezoelectric flexible ITO/PET substrates

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In this study, graphene layer was incorporated into zinc oxide nanorods to form flexible indium tin oxide (ITO)/polyethylene terephthalate (PET) substrates. Compared with ZnO nanorods with solgel/hydrothermal growth in a normal condition, the aspect ratio of ZnO nanorods could be enlarged by incorporating graphene into the seed layer. To examine the nanostructure of the deposited film, multiple material analyses were performed. ZnO/graphene nanostructures on ITO substrates with different growth condition had various surface morphologies observed by scanning electron microscope (SEM) and atomic force microscope (AFM). Material characterizations indicated that addition of graphene might strengthen the crystalline structures, increase the nanorod growth density and enhance antibacterial properties. Especially, graphene on bottom and graphene contained in the ZnO nanorods presented different antibacterial properties. Moreover, hydrophilicity measured by surface contact angle could be modulated and optical properties could be varied by incorporation of graphene. Results also indicated that piezoelectric properties can be observed from the substrate with and without bending on the substrate. With the increase of the bending pressure, the current from the ITO rises at the same time. Since ITO is used for solar cell and light emitting device applications, flexible ITO with Pi-electricity can further boost its potential for future nanopower generation devices with optical applications.

Biography

Hsiang Chen has completed his PhD in 2008 from University of California, Irvine. Currently, he is a distinguished Professor at National Chi Nan University, Taiwan, ROC. He has published more than 85 papers in reputed journals.

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