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Construction and Characterization of Photodiodes prepared with Bi2S3 Nanowires

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This work discloses the characteristics of a Bi2S3 nanowire / ITO photodiode and a manufacture method thereof; wherein, the high-crystalline Bi2S3 nanostructures were prepared by an environmental friendly dip-coating method onto Indium-doped Tin Oxide (ITO) coated glass substrates using bismuth nitrate and thiourea as raw material with DMF as solvent. The XRD spectra showed that the Bi2S3 nanowire exhibits orthorhombic structure, while the SEM images revealed the formation of uniform sized nanowires with diameter around 15.8 nm. The optical bandgap of the films had been estimated via Tauc plot and found to be in the range of 1.85 eV - 1.9 eV. In order to understand the I-V characterizations of the prepared diode showed prominent photo-response with a high photo-responsivity of 1.7 μA with a fast response time were reported in detail.

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