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Abstract View Online

Novel Self-powered UV-Visible Photodetector with Fast Response and High Photosensitivity Employing Fe:TiO_2/n-Si Heterojunction

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Abstract

A UV-Visible photodetector employing heterojunction between the Fe:TiO_2 and Si was fabricated via a facile solution process. The existence of built-in electric field between TiO_2 and Si help facilitate the separation of photogenerated electron-hole pairs and regulate the electron transport. Under zero bias, the device exhibited high responsivity of 46 mA/W (350 nm) and 60 mA/W (600 nm) with a 0.5 mw·cm^{-2} light irradiation. At a small reverse bias of -0.5V, the quantum efficiency of the heterojunction rise up beyond 100% with a broad wavelength range. The exploring of Fe:TiO_2/n-Si heterojunction photodetector demonstrates an ultrasensitive (on/off ratio up to 10^3), fast (rise/decay time of <10/15 ms), and broad-band (UV-visible) photodetection with no or low external energy supply. Such novel photodetector with Fe:TiO_2/n-Si Heterojunction might be potentially useful for relative applications with weak-signal fast detection in UV-visible band.

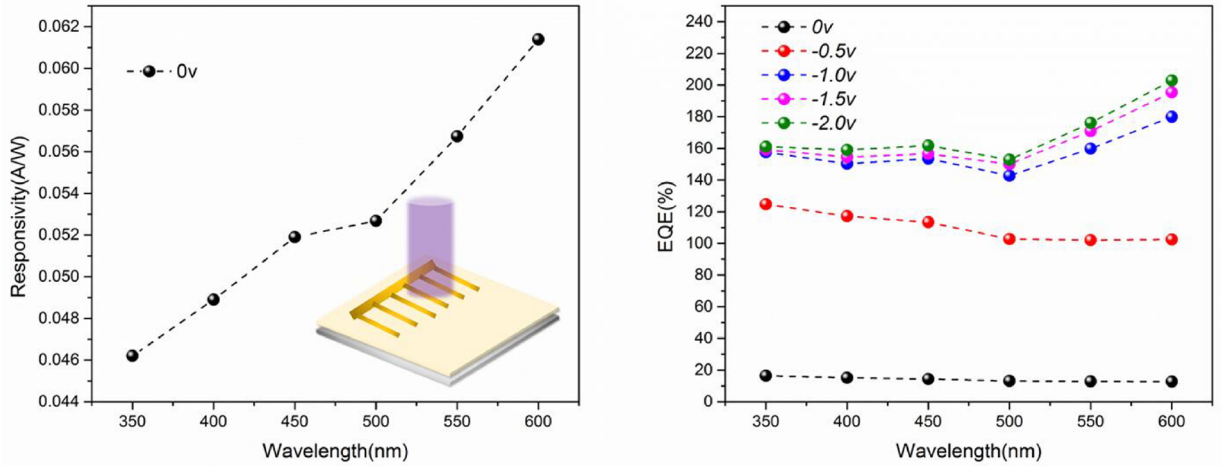

Figure 1. Responsivity and EQE of Fe:TiO_2/n-Si heterojunction under each bias in UV-visible band.

References

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