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Comparison of Semiconducting and Metallic Carbon Nanotubes Incorporating $\text{In}_2\text{S}_3/\text{In}_2\text{O}_3$ Photoelectrochemical Cells

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Abstract

We fabricate photoelectrochemical cells (PECs) using $\text{In}_2\text{S}_3/\text{In}_2\text{O}_3$ double-layer composite as a working electrode in the presence of single-walled carbon nanotubes (SWCNTs). Simple solution methods, such as spray-coating and chemical bath deposition, were used to assemble each layer in the PECs. We apply pristine SWCNTs, semiconducting SWCNTs (s-SWCNTs), and metallic SWCNTs (m-SWCNTs) to the PECs, and measure their solar performances, incident photon to charge carrier efficiency, and electroimpedance spectra. Field emission is also measured to explain the enhanced electric field of each cell.

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