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Gate-modulated SWCNT/SnO2 nanowire hetero-junction arrays on flexible polyimide substrate

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Recently, extensive research on hetero-junction arrays has been reported owing to its unique band gaps dissimilar to that of homo-junctions. These hetero-junction devices can be used in laser, solar cells, and various sensors. We report on the facile method to fabricate SWCNTs/SnO2 nanowires hetero-junction arrays on flexible polyimide substrate. Each SWCNT field effect transistor (FET) and SnO2 nanowire FET exhibits the purely p- and n-type charactersistics with ohmic contact properties. Such formed pn-junctions showed rectification behaviors reproducibly with a rectification ratio of~ 3x103 at 1 V and ideality factors about 12. The pn-junctions also showed a good gate modulation behavior.