Silicon nanowire array architecture for heterojunction electronics

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Photosensitive nanostructured heterojunctions *n*-TiN/*p*-Si were fabricated by means of titanium nitride thin films deposition (*n*-type conductivity) by the DC reactive magnetron sputtering onto nanostructured single crystal substrates of *p*-type Si (100).

The temperature dependencies of the height of the potential barrier and series resistance of the *n*-TiN/*p*-Si heterojunctions were investigated. The dominant current transport mechanisms through the heterojunctions under investigation were determined at forward and reverse bias.

The heterojunctions under investigation generate open-circuit voltage $V_{oc} = 0.8\,\text{V}$, short-circuit current $I_{sc} = 3.72\,\text{mA/cm}^2$ and fill factor $FF = 0.5$ under illumination of $100\,\text{mW/cm}^2$.

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