

Multisegment CdTe nanowire homojunction photodiode

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Electrochemical deposition in nanoporous ion track membranes is used for the preparation of multisegment CdTe—homojunction diode nanowires. Our study is based on the fact that the deposition overpotential strongly influences the composition of the compound semiconductor nanowires. Therefore, the transport behavior of the nanowire devices can be tailored by appropriately choosing a certain sequence of electrodeposition potentials. The wires were characterized using scanning electron microscopy, energy dispersive x-ray analysis, optical spectroscopy and x-ray diffraction. The current–voltage characteristics measured prove that, by appropriately choosing the voltage pulse pattern, one can fabricate nanowires with ohmic or rectifying behavior. The semiconducting nanowires are sensitive to light, their spectral sensitivity being characteristic of CdTe. The preparation of functional nanostructures in such a simple approach provides, as a major advantage, an increase in the process reproducibility and opens a wide field of potential optoelectronic applications.