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Biologically Active Nanocomposite of DNA-PbS Nanoparticles: A New Material for Non-volatile Memory Devices

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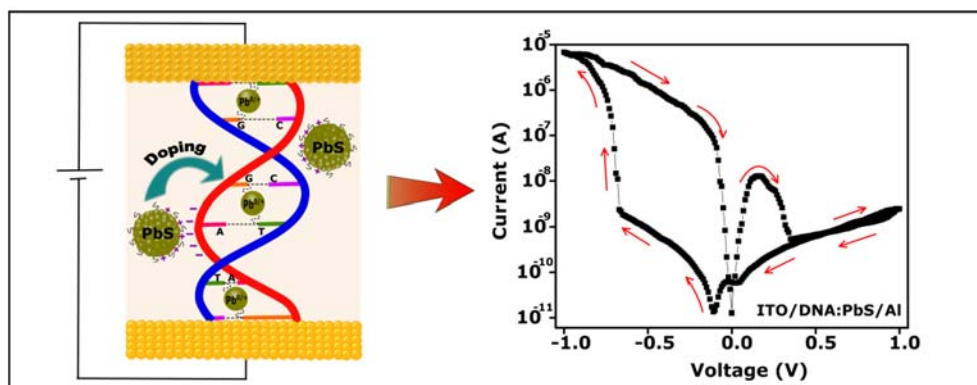
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Abstract Graphic



Abstract

Composite films of deoxyribonucleic acid (DNA) and lead sulfide (PbS) nanoparticles are prepared to fabricate biological memory devices. A simple solution based electrografting is developed to deposit large (few cm²) uniform films of DNA:PbS on conducting substrates. The films are studied by X-ray photoelectron spectroscopy, field emission SEM, FTIR and optical spectroscopy to understand their properties. Charge transport measurements are carried out on ITO-DNA:PbS-metal junctions by cyclic voltage scans, electrical bi-stability is observed with ON/OFF ratio more than $\sim 10^4$ times with good stability and endurance, such performance being rarely reported. The observed results are interpreted in the light of strong electrostatic binding of

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