

Functional Properties of Thin Films of Deoxyribonucleic Acid with Poly(3,4-ethylenedioxythiophene) and Poly(styrenesulfonate) Complex and Bistability of Their Photocurrent

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R sum  en anglais Functional photo- and electrical properties of thin films of DNA:PEDT-PSS were investigated. The sample current-voltage dependencies were linear and symmetrical down to liquid nitrogen temperature; the sample conductivity at 300 K was found to be $10(-10) \text{ } \Omega^{-1} \text{ cm}^{-1}$. The thermal activation energy of the dark conductivity was about 33 meV independently on the applied bias in the temperature region between 200 K and 300 K. Carrier trapping was evidenced by the Thermally Stimulated Current method. Nevertheless this effect was weakly expressed, most probably because of the fast recombination of generated carriers. Notably, a bistable photoconduction behaviour was identified below the room temperature at constant light excitation. Upon illumination of the samples by similar to 500 nm - 800 nm light a marked increase of the photocurrent took place by cooling them below 140 K - 160 K. In contrast, by heating the photosensitivity remained increased up to 230 K - 240 K. This effect could be associated with the light-induced modification of charge transport conditions in the samples.

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