Temperature Dependence of the Bistable Photoconductivity of Thin DNA: PEDOT Films

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Résumé en anglais	Thin DNA: PEDT-PSS layers were investigated. The functionalization of DNA by PEDT-PSS rendered the material electrically active, its conductivity being about (1-5) x 10(-10) Omega(-1)cm(-1) at the room temperature. The samples remained ohmic down to 77 K. The thermal activation energy of the conductivity near the room temperature was about 0.033 eV, and it decreased under 0.014 eV below 170-180 K. The weak carrier trapping was identified by the Thermally Stimulated Current method, proving the recombination of light-generated carriers. Notably, by constant light excitation a "bistable" photoconduction below the room temperature was evidenced. The photosensitive state could be induced by the light from the spectral region from similar to 500 nm up to similar to 1000 nm, with a maximum effect in the range of 650-800 nm. A remarkable increase of the photocurrent could be observed below 145-155 K by cooling the samples. Meanwhile by heating the photosensitivity remained increased up to 235-245 K. The long characteristic relaxation times after the light excitation in this state were proportional to the relative photosensitivity of material. This indicates that such phenomenon could presumably be attributed to the light-induced changes associated with PEDT-PSS, i.e., modification of the sample material morphology and/or induced variation of carrier transport conditions.
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