MOLECULAR STRUCTURE AND ELECTROPHYSICAL PROPERTIES OF PENTACENE THIODERIVATIVES

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Summary

Possible conformations of the thioderivatives of pentacene (Pn) have been considered. The absorption spectra of polythiopentacene (PTPn) solutions and films have been studied. PTPn is revealed to be a mixture of Pn thioderivatives with different numbers of S atoms. After this mixture having been condensed in vacuum onto quartz substrates, its main components are tetrathiopentacene (TTPn) and hexathiopentacene (HTPn). The position of the maximum in the long-wave absorption bands of Pn thioderivatives is a linear function of the number of valence electrons in S atoms, which take part in the conjugation with the π-system of the pentacene frame of PTPn molecules. The analysis of the photocurrent and capacitor photovoltage (CPV) spectra in the range of the first electron transitions in PTPn has shown that the photoconductivity is of the hole type and is caused by the dissociation of excitons at the electron capture centers. The frontal CPV is caused by the Dember photovoltage (φ_{D}), and the back one by the surface-barrier photovoltage (φ_{b}).