

FEATURES OF TRANSFORMATION OF LIGHT ENERGY IN THE PHOTOVOLTAICS FILMS OF POLY(3-HEXYLTHIOPHENE-2,5-DIYL) DOPED KI SALT

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Interest in the field of electronic processes in semiconducting polymers is associated with wide practical application of such materials to create the elements of molecular electronics, optoelectronics, photovoltaics, etc.

One of the possible ways to improve the efficiency of the polymer solar cells could be an increase in the singlet-triplet conversion in polymers. This can be achieved by changing the spin-orbit interaction, using external heavy atom effect.

A results of studies of an effect of external magnetic field on the photoluminescence films of P3HT, doped with the KI salt was presented in the abstract. The results of the studies suggested a possible mechanism for the effect of the MF on the photoluminescence films of P3HT-KI.

A luminescent properties of P3HT change in the presence of KI. Reduces of a lifetime of P3HT luminescence occurs with increase of KI. The intensity of the luminescence of the polymer depends on the impurity concentration. Low concentration adding of KI leads to an increase in the intensity of P3HT luminescence. When the impurity concentration KI in the polymer was high than 1 % the luminescence intensity leads to a significant drop in light intensity.

A magnetic field affects on the intensity of the luminescence of the film as pure P3HT film, as P3HT-KI film. Time-dependent magnetic effect on P3HT polymer photoluminescence was observed. KI concentration in the polymer film influences on the magnetic effect $g(B)$. Changing the sign of $g(B)$ from positive to negative occurs when adding KI in the amount of 0.05% by weight of the polymer. The value of $g(B)$ sharply increased up to 70 %. Reducing the value of the magnetic effect occurs with a further increase of the concentration KI. Then sign change from negative to positive is happening.

Changes in the magnetic effect on the photoluminescence films P3HT-KI associated with an increase in the concentration of triplet states in the polymer. The main process in the film magnetically P3HT-KI can be scattering in the triplet states of polarons polymer under the observation of the negative magnetic $g(B)$ effect.