TEMPERATURE EFFECT ON ABSORPTION AND RAMAN SPECTRA OF COMPOSITES OF CONJUGATED POLYMER AND LOW-MOLECULAR ACCEPTOR

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Diploma thesis abstract

This Diploma thesis is devoted to studies of temperature effect on absorption and Raman spectra of intermolecular charge-transfer complex (CTC) of conjugated polymer MEH-PPV and low-molecular acceptor trinitrofluorenon (TNF).

During the studies red shifts of long-wave edge of absorption spectra of MEH-PPV/TNF composites with decreasing of temperature from 320 to 120 K have been discovered. Following shifts have been obtained: 70±2 meV in pristine MEH-PPV, 63±2 meV in composition MEH-PPV/TNF 1:1. Obtained shifts have been explained in terms of conjugation length limitation model; several ways of conjugation disorder have been considered. As the result, it was proposed, that MEH-PPV conjugation length doesn't change with forming of the CTC and the absorption band shift is related to the difference between effective dielectric conductivities of polymer and CTC. Raman spectra of pristine MEH-PPV and composite MEH-PPV/TNF 1:0.3 under temperatures from 300 to 120 K have been studied as well. Red shift of 1582 cm^{-1} Raman scattering band for 0.4±0.1 cm^{-1} has been obtained in pristine MEH-PPV. Opposite blue shift for 0.4±0.1 cm^{-1} has been obtained in CTC Raman spectrum. This behavior of Raman spectra could be explained with assumption that the charge transfer in CTC strongly depends on temperature.

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