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OPTICAL PROPERTIES OF COMPOSITE MATERIALS BASED ON CONJUGATED POLYMERS AS POLY-P-PHENYLENEVINYLENE (PPV) AND ITS DERIVATIVES WITH HIGHLY SEPARATED CARBON NANOTUBES AND GRAPHENES

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1. Introduction

The composite materials based on conjugated polymers became increasingly often used in organic electronic devices due to the polymers' optical, electrical and mechanical properties, and to their advantage in terms of production costs and ease of solution processing.

In this context, this work investigates the influence of carbon nanoparticles, such as single walled carbon nanotubes (SWNTs) and reduced graphene oxide (RGO), on the optical properties of poly (p-phenylenevinylene) (PPV) [1-3].

By increasing the concentration of carbon nanoparticles, important variations were recorded in the relative intensities ratios corresponding to the maxima of PL spectra of composite materials.

This fact can be correlated with a change of the conjugation length of polymers chains due to the presence of these nanoparticles during the conversion process.

The generation of short polymer chains represents an important aspect that must be considered in the luminescence quenching process due to carbon nanoparticles, such as carbon nanotubes and reduced graphene oxide, which are actively involved as acceptors of electrons generated in the PPV polymer due to excitons' dissociation.

The understanding of processes associated with energy transport, in terms of time and distance, is important for the optimization of the composite structure [4].

The investigation of optical processes represents an attractive subject, which deserves to be explored for a better understanding of the luminescence quenching and for the identification of the chemical species involved in this process.

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