

Nanooptics and nanophotonics

Photovoltaic properties of film composites based on non-photoconducting polymer with a high concentration of xanthene dye

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Recently, solar energy photovoltaic converters based on film structures of organic materials attracted much attention [1,2]. The dyes layers or their aggregates in the polymeric matrix can be used as photogenerative and photoconductive layers. In this connection, the investigation of photoelectric and photovoltaic properties of the thin film structures based on non-photoconducting polymers is of great interest. In the present work, we found that polymeric composites films based on polyvinyl alcohol doped with xanthene dye additives exhibit photovoltaic properties under illumination by light from the dye absorption region. The corresponding photovoltaic response demonstrates quite little changes at dye concentration > 10 mass%. It was established that the photovoltaic effect is related to the electric charge carriers photogeneration in the dye aggregates and nonequilibrium charge carriers transfer between them. It was concluded that to reduce the cost of photoactive media for the photoelectric converters, the low-cost polymers doped by sufficiently high organic dyes concentration can be used.

1. *Alferov Zh.* The semiconductor revolution in the 20th century // Russ Chem Rev.-2013.-**87**, N 7.-P. 587-596.
2. *Davidenko N.A., Davidenko I.I., Ishchenko A.A., Korotchenkov O.A., Mokriskaya E.V., Studzinsky S.L. e. a.* Donor oligomer based film heterostructures doped with squarilium organic dye and their photoelectric properties // Molecular Crystals and Liquid Crystals.-2014.-**589**.- P. 147-153.