Abstract to thesis of master of physics degree

Photoluminescence in crystals of organic semiconducting oligomers

Field of the work. The work in the field of organic electronics was devoted to photoluminescence (PL) in crystals of organic semiconductors. The aim of the work was to study the self-doping as a way of increasing, and multiple crystal bendings as a factor of reducing the PL efficiency in oligothiophene-phenylenes crystals.

Materials and methods. The studied oligothiophene-phenylenes were 5,5′-bis[4-(trimethylsilyl)phenyl]-2,2′-bithiophene (TMS-P2TP-TMS), 5,5‴-bis[4-(trimethylsilyl)phenyl]-2,2′:5′,2″:5″,2‴-quaterthiophene (TMS-P4TP-TMS), 1,4-bis(5′-hexyl-2,2′-bithiene-5-yl)benzene (DH-TTPTT). The absolute PL efficiency of the crystals was evaluated by the integrating sphere method. To estimate the PL efficiency changes in the crystals after multiple bendings, the experimental scheme of PL collection suggested in the present work was applied.

The main results of the work. The following conclusions were made: 1) self-doping was demonstrated as a way to increase the PL efficiency in TMS-P2TP-TMS oligothiophene-phenylene crystals; 2) multiple bendings of DH-TTPTT oligothiophene-phenylene crystals was not a factor of reducing the PL efficiency.

According to the work results, two articles in Advanced Functional Materials and Synthetic Metals have been published.

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