

Structure and charge transport in the nanocomposites of polyaminoarenes in polystyrene matrix

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Conductive film nanocomposites based on conjugated polyarenes and elastic polymer matrices are representatives of a new type of composite materials, in which, unlike traditional metal fillers (conductive components), conjugated polymers with their own electron conductivity are used. Polystyrene is one of the most important commodities of polymer widely used in household goods, packaging, automobiles and other engineering applications [1].

In the present research, the main features of structure, morphology and charge transport in composites based on polyaminoarenes (polyaniline and its derivative – poly-*o*-toluidine) in the elastic matrix of polystyrene were studied.

The influence of nature and concentration of polyaminoarene on the morphology of film samples and the structure of composites by X-ray diffraction analysis and infrared spectroscopy have been investigated. The thermal stability of the obtained samples was studied. Based on the temperature dependence of the resistance of polyaminoarenes and their composites with polystyrene, the activation energy of charge transport within the band model and the activation parameter T_0 for the Mott model of 1D and the 3D jump of variable length were determined. The influence of the polyaminoarenes concentration in the polymer - polymer composites and the method of synthesis on the activation parameter of conductivity and connection with the structural features were analyzed.

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