

**STUDIES OF THE PHYSICAL, OPERATIONAL AND OPTICAL-SPECTRAL  
CHARACTERISTICS OF THE HIGHLY TRANSPARENT  
TOLUENESULFONAMIDE AND BENZGUANAMINEFORMALDEHYDE  
POLYMERS**

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To date, there has been much research aimed at finding new transparent polymer bases, to obtain light-sensitive materials based on thermosetting polymers, which are characterized by higher operational characteristics than traditional thermoplastic optically transparent materials. The synthesis and further processing of thermosetting polymers are associated with significant internal stress and chemical shrinkage, which almost always lead to instability of the optical characteristics during operation. At the same time, the filling of the channels and forms in the processing of thermosetting oligomers has considerable specificity and often does not allow obtaining optically transparent products from these materials. No less significant challenges are associated with surface defects of products made of thermosetting oligomers in obtaining transparent parts. Therefore, today obtaining highly transparent polymers of the thermosetting type is quite a challenge. That is why today toluene sulfonamide and benzguanamineformaldehyde polymers – colorless transparent materials, which in their structure have the ability to luminescence are of considerable interest from the point of view of obtaining transparent polymeric materials with luminescent properties.

The researching of the synthesis of toluene sulfonamide and benzguanamineformaldehyde oligomers and polymers with luminescent properties was carried out. The physical-chemical regularities of the process of producing transparent toluene sulfonamide and benzguanamineformaldehyde oligomers and polymers with high spectral-luminescent properties were investigated. It is shown that the modification of oligomers with glycerol with a content of 20 wt % allows obtaining materials with high light transmittance (90–91 %) and low residual stress (10–15 MPa).

The toluene sulfonamide and benzguanamineformaldehyde polymers, which are characterized by low water absorption, high physical–mechanical characteristics when the light transmittance of about 90 % were synthesized. It was found that such an important characteristic of scintillation plastics BAL, in the above-mentioned materials is at the level of PS and PMMA – 40–60 cm to 50–200 cm. It is shown that toluene sulfonamide and benzguanamineformaldehyde polymers are characterized by the extinction coefficient of up to 9000–12000 and the intensity of the luminescence with the relative quantum yield of up to 10 % in the range of 360–365 nm.