

EPOXIDE–BASED PHOTOACTIVE MATERIALS FOR OPTOELECTRONIC APPLICATIONS

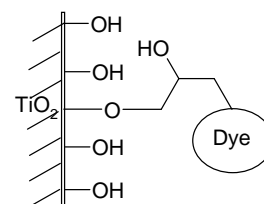
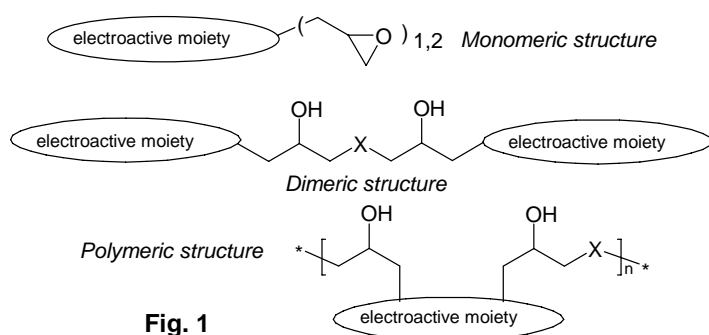
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We are engaged in synthesis, investigation and application of organic materials for optoelectronic devices, including electrophotographic photoreceptors, OLEDs and solar cells. Monomeric, dimeric and polymeric photoactive materials (PAM) with the following structures (Fig.1) were developed and evaluated.



The general synthesis of all these derivatives involves the reaction of the compounds possessing heterocyclic or aromatic chromophores with epichlorohydrin. The dimeric and polymeric structures require an additional reaction step involving a linking group X to connect the photosensitive units to a dimeric structure or polymeric chain. The structures of the final products are confirmed by ¹H-NMR, ¹³C-NMR, MS, UV and IR spectra. The charge carrier mobility, ionization potential and other characteristics are measured. The presence of oxiranyl or hydroxyl groups improves adhesion and film-forming properties. Moreover, such dimeric or polymeric PAM can be chemically cross-linked in a layer. This PAM property enables us to increase the layer resistivity with respect of bending, stretching and abrasion, and renders it insoluble in various organic solvents. Layered structures may be prepared with these compounds.

Recently we designed and synthesized hemicyanine and other dyes bearing epoxy groups for investigation of the adsorption on the TiO₂ surface. We have developed a simple procedure for preparing covalently attached dyes to the nanocrystalline TiO₂ (Fig. 2).