Nanooptics and nanophotonics

Photosensitive copolymethacrylates with pendant styrylquinoline chromophores

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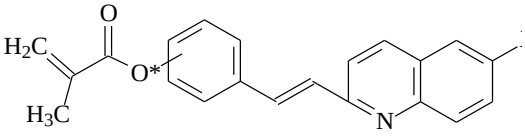
Photochromic materials have potential applications for information storage, the controlled on/off digital switching of synthesized molecules by photo-irradiation. Therefore, our current research interests concern new polymer materials for photonics applications. We will focus on investigation of a new type of polymers with styrylquinoline fragment. It is well know that 2-Styrylquinoline comprises two functional active sites, ethylenic group and aza-function (endocyclic nitrogen atom), and can exist in four forms which are thermally stable, have different spectral properties, and are easily interconvertible.

Our work was devoted to obtaining styrylquinoline containing monomers and investigation their polymerizations properties. The common structure of synthesized methacrylic monomers is representing below:



* p- and m- isomers, X=H(M1), OCH_3(M2).

The polymerization ability of the new monomers was investigated kinetically for radical homopolymerization and copolymerization with MMA by dilatometric method. The process was conducted in 10 wt% dimethylformamide solution at 80 ºC (argon atmosphere, initiator – AIBN 1 wt%); contractions were measured by KM-6 cathetometer. Monomers conversion during the homopolymerization process of mM1 was 58% in 240 min for copolymerizaton process pM1:MMA (1:3), mM1:MMA (1:3), M2:MMA (1:3) conversions were 47%, 54%, 57% in 240 min respectively. The copolymerization ratio was calculated on the basis of the integration ratio of ^{1}H NMR measurements. The glass transition temperatures (T_g) of all polymers were determined by differential scanning calorimetry.