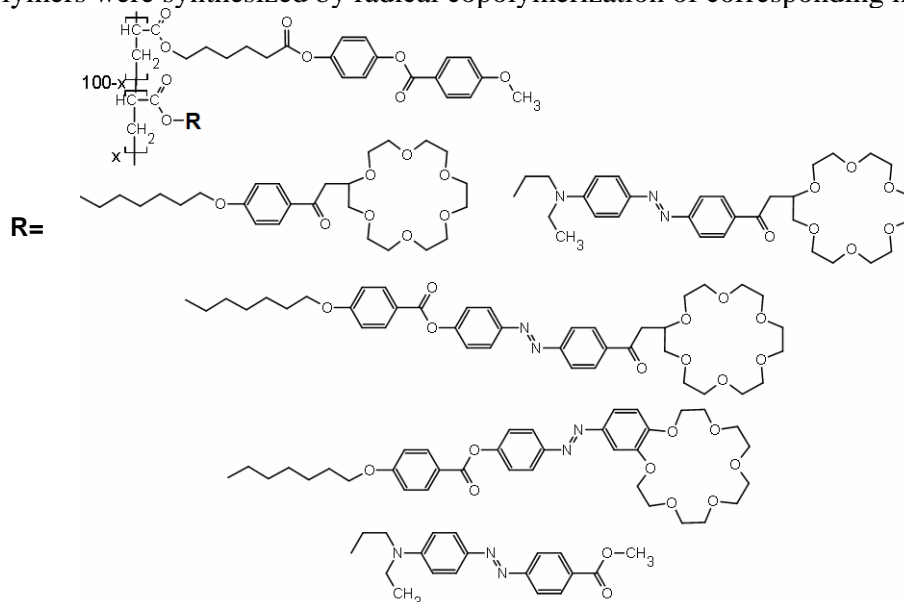


Photochromic LC copolymers containing crown ether groups.

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An approach for the creation of a novel family of multifunctional crown-ether-containing comb-shaped copolyacrylates consisting of chromophoric (azobenzene), ionophoric (crown-ether) and mesogenic groups in the same macromolecule was developed. Five series of copolymers were synthesized by radical copolymerization of corresponding monomers:



Phase behavior of the copolymers was studied, and correlation between their molecular structure and thermal properties was established. It was shown that the increase of bulky crown-ether-containing groups' concentration leads to disruption of nematic order and formation of amorphous phase. Complexation with potassium perchlorate leads to further decrease in mesophase thermostability due to the significant reducing of the side group anisometry by perchlorate counter ion. The comparative investigations of photooptical properties and photoorientation processes of copolymers and their complexes were performed. An essential influence of crown-ether moieties on kinetics and mechanism of photooptical processes was revealed; the bulky crown-ether substituents and their complexes with metal ions decrease rotational mobility and prevent photoorientation process of azobenzene fragments diminishing photoinduced orientation and order parameter.

References

- (1) V. Shibaev, A. Medvedev, A. Bobrovsky, *J. Polym. Sci., A: Polymer Chemistry*, **2008**, *46*, 6532