Synthesis and Properties of Spiroxazine Polymer Derived from Cyclopolymerization of Diallyldimethylammonium Chloride and Diallylamine

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A photochromic compound is characterized by its ability to undergo a reversible colour change. The principal studies of photochromic compounds involved acquiring an interest into mechanisms of the photoprocesses, determining the structures of the uncoloured form and the coloured form, and developing synthetic methods. the photochromism of spiropyran has been extensively studied, little work has been carried out on spironaphthoxazine dyes. These two classes of compounds are similar in many respects. However, the replacement of the benzopyran ring by a naphthoxazine ring result in spironaphthoxazine having the advantage of greatly improved resistance to prolonged UV irradiation. The photochromic reaction is caused by the reversible heterolytic cleavage of the C(spiro)-O bond under UV irradiation, yielding the coloured form that can return to the colourless form by ring closure under visible light irradiation or in the dark. The present article reports on the synthesis of diallyldimethylammonium chloride and diallylamine and the photochromic properties of the resulting cyclopolymer.