APPENDIX
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Research & Post Graduate
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NATIONAL SYMPOSIUM ON METALLO-ORGANIC CHELATES AND
RECENT ADVANCES IN CHEMISTRY (NSMCRCRAC)
Synthesis and Characterisation of Phenolphthalein Based Thermotropic Liquid Crystalline Random Copolyesters

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Abstract

Four new thermotropic liquid crystalline (TLC) random copolyesters were prepared from phenolphthalein, ethylene glycol and propylene glycol by polycondensation with naphthalene dicarboxyl chloride and azobenzenedicarboxyl chloride in o- dichlorobenzene solution. These polymers were characterised by viscosity measurements, solubility studies, IR, $^1$H NMR, $^{13}$C NMR and UV- Visible spectra. Thermal transition temperatures such as $T_g$, $T_m$, $T_c$ were determined from DSC thermograms. TLC behaviour of these polymers was investigated by optical polarising microscopic studies. These polyesters derived from the two acid chlorides were comparatively investigated.
Synthesis and Characterisation of Thermotropic Liquid Crystalline Copolyesters Containing Cyclohexane Moiety

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Abstract

Two copolyesters were prepared from 4,4'-oxybis(benzoic acid) and two diols, namely, 1,4-cyclohexane diol and quinol by polycondensation method. The condensation reagent was diphenylchlorophosphosphate (DPCP). The use of this reagent improved the yield of the polyester. The polyesters were characterised by solubility data and viscosity values. The structure of the repeating units in the two polyesters were confirmed from FT IR, $^1$H NMR, $^{13}$C NMR spectral data. The thermal properties of the two polyesters are investigated by DSC studies. The transition temperatures such as $T_g$, $T_m$ and $T_{cl}$ of the polyesters were obtained from DSC thermograms. These thermograms indicate that both polyesters exhibit thermotropic LC behaviour. The polyester obtained from quinol is thermally more stable than the polyester obtained from 1,4-cyclohexane diol.
Papers accepted for publication in 'Journal of Polymer Materials'
Synthesis and Characterisation of Certain Thermotropic Liquid 
Crystalline Random Copolyesters Containing Azobenzene Moiety in 
the Main Chain

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Abstract

Two series of twelve new random copolyesters were synthesised from 4,4’-azodibenzoic acid, one series with 1,8-dihydroxyanthraquinone and the other using 2,5-ditertiarybutylquinol as common monomers. Six different arylidene diols were employed in the polycondensation. Diphenylchlorophosphatate (DPCP) was used as the condensation reagent in pyridine medium. Viscosity measurements, FT IR, \(^1\)H and \(^{13}\)C NMR spectral data were used for investigating their structural features. The thermal phase transitions and thermotropic liquid crystalline (TLC) behaviour of these polymers were investigated by differential scanning calorimetry (DSC) and optical polarising microscopy (OPM). Scanning electron microscopy (SEM) coupled with UV irradiation experiments were used to establish the photocrosslinkability of these polyesters. Interestingly, these azopolyesters containing arylidene keto moiety in the main chain exhibited nematic mesophase and were photocrosslinked upon UV irradiation. These polyesters may emerge as potential candidates as non-linear optic (NLO) materials.

Key Words: Thermotropic Liquid Crystalline, Azopolyester
Ultrasonic Method of Determination of Glass Transition Temperatures of Certain Thermotropic Liquid Crystalline Co-polyesters

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Abstract

The acoustical parameters such as adiabatic compressibility (β), linear free length (L_r), internal pressure (π), fractional free volume (f), coefficient of thermal expansion (α_v), coefficient of adiabatic compressibility (α_b) and exponent of repulsive forces (n) of nine copolyesters calculated from the measured ultrasonic velocity (u) and density (ρ) values at different temperatures in o-dichlorobenzene solution showed nonlinear variation in the vicinity of glass transition temperatures (T_g) of these polymers. Glass transition temperatures were obtained for the nine polymers from the variation of acoustical parameter with temperature. These values agreed well with those determined from DSC thermograms. Further, glass transition has been found to be second order transition as non-linear variations were found in the change of ∆U/∆T, β, L_r values with temperatures. The acoustical properties of the polymer solutions at T_g value suggest that the polymeric molecules interact strongly and associate inspite of thermal agitation by the solvent molecules. At T_g value of the polymer the solute-solute interactions have been found to be stronger than solute-solvent interactions.

Key Words: Ultrasonic methods, Glass Transition Temperatures.