APPENDIX

PUBLICATIONS

ABSTRACTS OF THE PAPERS

Abstract

1. Mesomorphic Behaviour of the Cholesteryl Esters - I. p-n-Alkoxybenzoates of Cholesterol.

J.S.Dave and R.A.Vora.

Liquid Crystals and Ordered Fluids, edited by J.F.Johnson and R.S.Porter, Plenum Press, p. 477 (1970).

A homologous series of cholesteryl p-n-alkoxybenzoates has been synthesised and its mesomorphic behaviour studied. All the members of the series are enantiotropic mesomorphic. The higher members starting with cholesteryl p-n-heptyloxybenzoate exhibit enantiotropic polymesomorphism-smectic and cholesteric mesophases; the smectic mesophase increases with the increase in the alkyl chain length in the series at the cost of the cholesteric mesophase.

All the members of the series exhibit iridescent colours with the change in temperature, the colour intensity decreasing as the alkyl chain length increases and the last two members of the series do not show any colour change. At the smectic-cholesteric phase transition, a colour spectrum is observed both while heating as well as cooling. The higher members in the series show homeotropic smectic texture on cooling.

2. Mesomorphic Behaviour of Cholesteryl Esters - II. Trans-p-n-Alkoxycinnamates of Cholesterol.

J.S.Dave and R.A.Vora.

Mol. Cryst. Liquid Cryst., 14, 319 (1971).

A homologous series of cholesteryl (trans-p-n-alkoxy)-cinnamates has been prepared by reacting trans-p-n-alkoxy-

cinnamoyl chlorides with cholesterol, and its mesomorphic behaviour studied. All the members of the series are enantiotropic mesomorphic. The lower members of the series exhibit cholesteric mesophases, whereas the higher members, starting with the decyloxy ester, are polymesomorphic, smectic and cholesteric. The smectic mesophase increases with an increase in the alkyl chain length at the cost of the cholesteric mesophase. The decyloxy and dodecyloxy esters also exhibit enantiotropic polymesomorphism of the smectic phase. The cholesteric mesophase persists upto the last member of the series. All the members of the series exhibit iridescent colours with a change in temperature; even the last member of the series exhibits this phenomenon which is not the case in the corresponding n-alkanoates or the p-n-alkoxybenzoates of cholesterol. At the juncture of the smectic-cholesteric transition a colour spectrum is observed both while heating as well as cooling. The thermal stabilities of the mesophases of the series are compared with those of the n-alkanoates and the p-n-alkoxybenzoates of cholesterol.

3. Mesomorphic Behaviour of Cholesteryl Esters:- Part III- Substituted Benzoates of Cholesterol.

J.S.Dave and R.A.Vora.

Ind. J. Chem., 11, 19 (1973).

Different cholesteryl benzoates having substituents in different positions of benzoic acid moiety have been prepared and their mesomorphic properties studied. Ortho- and para- derivatives are enantiotropic cholesteric. All meta compounds are monotropic cholesteric except cholesteryl meta-nitrobenzoate which is enantiotropic cholesteric.

Para- substitution increases the thermal stability of the compounds which is always higher than the present compound, i.e. cholesteryl benzoate. The substitution in the ortho- and meta- positions in cholesteryl benzoate reduces the thermal stability of the compounds, the order of thermal stability being para > parent compound > meta > ortho. An attempt has been made to derive group efficiency orders in different substitution positions and these are compared with the similar group efficiency orders obtained by other workers.

4. Mesomorphic Behaviour of Biphenyl Esters I : Biphenyl 4-trans-p-n-Alkoxycinnamates.

J.S.Dave and R.A.Vora.

(Communicated to Mol. Cryst. Liquid Cryst., London).

Fourteen homologues of biphenyl 4-trans-p-n-alkoxycinnamates have been prepared by reacting trans-p-n-alkoxycinnamoyl chlorides with 4-hydroxybiphenyl and their mesomorphic behaviour studied.

All the members of the series are mesomorphic; methyl to hexyl derivatives are only nematic, heptyl to tetradecyl derivatives are both smectic and nematic while hexadecyl and octadecyl derivatives are purely smectic. The smectic phase originates at heptyl homologue as a monotropic mesophase and becomes enantiotropic for the succeeding homologues. The nematic phase is enantiotropic throughout.

When the transition temperatures are plotted against the number of carbon atoms in the alkyl chain the transition curves behave in a normal manner analogous to other homologous series exhibiting nematic and smectic mesophases. The thermal stabilities of the mesophases of this series are compared with those of the other related mesomorphic series.