

THEME OF THIS INVESTIGATION

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A large number of homologous series exhibiting smectic and nematic mesophases have been synthesized and studied to investigate and establish relationship between molecular structure and mesomorphism. However very little work has been done on the naphthalene derivatives. It would be quite interesting to study the effect of broad naphthalene nucleus on mesomorphic properties by varying the length of the molecules. In an attempt to correlate the effect of broader naphthalene molecules on mesomorphism, present homologous series with naphthalene nucleus are synthesized and their mesomorphic properties are evaluated. Their thermal stabilities are compared with those of other related homologous series.

The effect of unsymmetrical molecules having different end groups on mesomorphism is quite interesting and has been studied in p-phenylene derivatives having two similar bridge groups. The effect would be more enhanced if the molecules have two different bridge groups instead of two similar bridge groups. Keeping this in view some homologous series are synthesized having p-phenylene moiety and ester and azomethane bridge group. The group efficiency order obtained in the present study is compared with similar group efficiency order obtained in other studies for promoting smectic and nematic mesophases.

The homologous series with terminal nitro and cyano group has created interest in the liquid crystal research as compounds having these terminal end groups exhibit positive dielectric anisotropy useful in display devices. Very few homologous series with these terminal groups are synthesized and the effect of these end groups on liquid crystalline properties is being studied by number of workers in the field. In the present study two homologous series are synthesized having terminal nitro and cyano groups to evaluate the effect of these groups on liquid crystallinity.

The naphthalene compounds synthesized in the present study exhibit low melting nematic mesophase. Some of these compounds are monotropic in nature. It is known that a binary mixture of such compounds would exhibit mesophase at still lower temperatures. The low melting nematogens have number of application in different fields. With a view to study the trend in binary mixtures of the present naphthalene compounds three systems are investigated where the combination of components A and B is varried.