OBJECT OF THE INVESTIGATION

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It is now known that a nematic liquid crystal is a system in which rod-shaped molecules have translational freedom, but only a restricted rotational freedom and that such a liquid possesses a domain structure wherein all the molecules in a given domain lie parallel to one another. Any second substance dissolved in such a liquid would then be in an anisotropic environment and it is likely that its chemical and physical properties might be affected in an interesting manner thus giving rise to mixed liquid crystals over a useful range of temperature and concentration.

Most of the investigations carried out in the past, on mixed liquid crystals were mainly based on phase rule and its elucidations. Very little work appears to have been done on the mode of formation of mixed liquid crystals and the extent to which such genuine mixed liquid crystal formation can take place.

Recently such an attempt was made and the effect of polarity of the terminal groups on the mode and the extent of the formation of mixed liquid crystals has been interpreted in terms of the slope of the transition lines. Different values have been calculated and an order of group efficiency has been deduced. This order of group efficiency has been based on the study of binary systems comprising only a single liquid crystalline substance viz. p-azoxyanisole ; there seems to be no further evidence to show that this order of the groups

would remain the same or generally be valid, whatever be the liquid crystalline component in the binary systems of isomorphous substances exhibiting mixed mesomorphism. Further, the evidence correlating the structural and other chemical features which affect mixed liquid crystal formation also seems to be scanty.

It was therefore, considered worthwhile and interesting to carry on the study further, in order to bring about the specific effect of the terminal groups of different polarities and length which might throw more light on the subject. It is from this point of view that several binary systems comprising another liquid crystalline substance viz. p-acetoxybenzal-p-phenetidine have been investigated during the course of the present investigation.

Still more scanty is the evidence pertaining to the mixed liquid crystal formation in binary mixtures of non-liquid crystalline substances. Therefore, in order to arrive at some conclusions regarding the factors that influence the mixed mesomorphism in such mixtures, a number of binary systems have been studied, wherein both the components are by themselves non-liquid crystalline.

Further, no work seems to have been done on the effect of dissolution of a non-liquid crystalline substance in a liquid crystalline component exhibiting both smectic and nematic phases. Hence, some binary systems of such an interesting type have been studied with a view that such a study would throw some more light on the nature of

the mesomorphic state and mixed liquid crystal formation.

Above all, the idea that a detailed study of mixed liquid crystals would, in general, throw more light on the existing data and develop the chemistry of the mesomorphic state and finally the hope that this work would be another stepping stone for further research in liquid crystals, initiated the present investigation.