OBJECT

OBJECT

The applications of liquid crystalline materials in the fields of thermography, defence gadgets, chromatography, medicine and display devices have led them to an unprecedented glory and demand. From a barely 250 compounds known to exhibit liquid crystallinity in the thirties of this century, they have grown to be in thousands and yet there seems to be a big ground to be covered up, for as they grow in number, greater details with regard to their chemical constitution spring up besides adding new facets. Obviously, search for new 'mesogens' and study of their structural characteristics have all the significance which a growing field of knowledge can command for further unhindered growth and expansion.

In this investigation, therefore, it was planned to synthesize new mesogens; their 'design' from the molecular structure view point was so evolved as to permit one variation at a time. This will result into a sequential variation in the display of molecular forces. Their correlation would emerge quite distinctly thus. While a quantitative assessment of of the variations and their correlation may not be coming forth by such a method since quite a few unrevealed factors would have remained unaccounted for, a fairly qualitative assessment of the correlation can be well established.

Study of the mesomorphic characteristics of the newly synthesized mesogens will be the second most important aim of

this investigation. The study of mesomorphic characteristics will reveal the relevant evidence in support of the existing theories, and probably new light may emerge though the study will be restricted to some extent by the restraints and limitations of the laboratory where the investigation is carried out. Optical microscope will be the main means of the study of the basic characteristics.

Thirdly, it is thought as necessary to obtain more corroborating evidence by other methods, though direct availability of the facility may be a problem. TGA, DTA, DSC and IR facilities will have to be sought from outside agencies, some restrictions will obviously be there to our disliking though. These methods in the case of homologous series is aimed with the view of strengthening the conclusions derived by optical microscopy.

Fourthly, study of binary systems comprising components from among the newly synthesized homologous series has been considered of interest with the view of finding out the extent of enhancement or otherwise of the mesomorphic ranges and studying the conditions and combination of terminal and/or lateral substituents which may or may not provide emergence of mesomorphism over a range of temperature and concentration out of mesomorphs and/or non-mesomorphs. While it is realised that more fruitful results would be obtained by advanced systems of mixed study, this part of the project will be limited to optical microscopy only, and yet, the results will be of great source of encouragement not only because they will be of

significance but also because they will show the direction for further exploration.

Lastly, but not in the least, the purpose of this investigation is to arrive at certain specific conclusions by way of an analytical approach to the existing knowledge in the subject matter as viewed from the background of the large number of newly synthesized mesogens under this investigation and their characteristics. It may not be out of tune to make a passing reference to the conscious efforts to more than compensate the deficiency due to non-availability of proper facility, by extending the synthesis programme and study of the characteristics of a very large number of new mesogens, besides studying typical mixed binary systems.