SUMMERY

Salient features of the “Results and discussion” are presented as prominent gains of the present investigation undertaken are mentioned below. The point wise list of work done on new homologous series of liquid crystal and nonliquidcrystal materials are as under.

1. All the eight homologous series consisting of 91 new substances, fifty eight substances, are liquid crystals and exhibit mesogenic property over considerable mesomorphic range.

2. Homologous series 1 to 8 are ethylene homologous series with -CH=CH-CO-, -COO- and -CO-CH=CH-, -CH=CH-COO-, as a central bridge and -OR as well as –OCH₃, -NO₂ –H, -Cl are terminal group. Where R= CₙH₂n+1 with normal linking.

3. Molecules of all the homologous series (1 to 8) are having sufficient rigidity, and flexibility with usual polarity, breadth and polarizability to cause anisotropic intermolecular forces of attractions of suitable magnitude to form mesogenic phase.

4. All the homologous series 2, 3, 5, 7 are entirely nematogenic while, series 1, 4, 6, 8 are predominantly nematogenic and partly smectogenic in character.

5. Commencement of mesophase generally takes place from fifth/sixth homologue of homologous series except 1 and 6 homologous series in which mesophase commences from third homologue.

6. None of the homologous series exhibit smectic or nematic mesophase in monotropic condition. i.e. All the 58 new mesogenic substances exhibit enantiotropic smectic or / and nematic liquid crystals.

7. Polymesomorphism is exhibited by some members of series 1 and 4 enantiotropically proving a view that, as molecular length increases, the ratio of the length to breadth increases and intermolecular forces of attractions are strengthened to cause lamellar arrangement of molecules in crystal lattices resulting into sliding layered arrangement of molecules in floating condition.

8. Nematic-isotropic transition curve initially rises and then falls after passing through early maxima, or it rises and passes through late maxima or it falls initially and rises after passing through minima or it shows descending tendency without passing through early or late maxima or minima and behaves
in normal manner as expected and observed in case of other homologous series. Thus, it can be concluded that nematic-isotropic transition curve may adopt any trend of transition temperatures as series is ascended with or without odd-even effect depending upon variation of molecular rigidity and flexibility.

9. Transition temperatures of some homologues for smectic and / or nematic are predictable by smooth extrapolation of transition curves.

10. Display of mesophase is attributed to its molecular length and/or breadth ; as well as polarity of lateral and/or terminal functional groups and their position.

11. The extent to which mesophase exhibited is directly related to the magnitude of polarity of terminal groups of second component (B) and its position.

12. The order of polarity for nematic mesophase of terminal groups derived from the present investigation is in good agreement with previous work.

13. The credibility of extrapolation method of determining L.T.Ts is raised from the present investigation.

14. Once the effect of polarizability is eliminated as a common effect, the polarity of the terminal groups will have greater influence in liquid crystal formation.

15. Study may be useful for the devices to be operated thermotropically.