PREFACE

The present dissertation entitled "STUDIES ON SOME BIPHENYL BENZOATE BASED CHIRAL LIQUID CRYSTAL COMPOUNDS" is submitted to fulfill the requirements for the degree of Doctor of Philosophy (Science) of the University of North Bengal. This thesis includes a detailed investigation of the properties of eight chiral liquid crystal compounds having biphenyl benzoate core and formulation of one room temperature ferroelectric liquid crystal mixture. The work presented here is expected to be helpful in realizing a relationship between the changes in physical properties of the selected compounds with change in their molecular structures and also to recognize the efficacy of the compounds in formulating mixtures suitable for display applications. Most of the studies presented here have been carried out in Liquid Crystal Research Laboratory, Department of Physics, University of North Bengal under the supervision of Prof. Pradip Kumar Mandal, Department of Physics, University of North Bengal. However, the synchrotron X-ray diffraction experiments were carried out at Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany.

The thesis contains eight chapters.

A brief introduction to liquid crystals and list of investigated compounds are given in **Chapter 1**.

In **Chapter 2** the theoretical backgrounds and the experimental techniques used for characterizing the liquid crystal materials have been discussed in detail.

Chapter 3 describes the characterization of 1F3R, with least number of carbon atoms in the chain and the only compound having no tilted phase

phases, by polarizing optical microscopy, synchrotron X-ray diffraction and dielectric spectroscopy.

Chapter 4 presents the phase behavior, structural, dielectric and electro-optic properties of 2F3R and 3F3R.The molecular structures of 2F3R and 3F3R differ from that of 1F3R only by one and two number of carbon atoms in the fluorinated chain respectively, resulting in the induction of tilted phases.

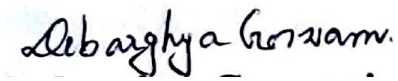
In **Chapter 5** phase sequence, dielectric and electro-optic properties of the compounds 5F3R and 6F3R, which show only ferroelectric phase throughout its liquid crystalline state, have been discussed.

In **Chapter 6** properties of 4F4R and 4F5R, the only two compounds in this series for which number of oligomethylene spacers differ from other compounds, have been presented.

In **Chapter 7**, 7F3R**,** the longest among the selected compound has been characterized. Using this compound as dopant, the formulation and characterization of one room temperature ferroelectric liquid crystal mixture has also been discussed in this chapter.

Summery and conclusions and of all the experimental results have been presented in **Chapter 8**.

A list of selected books and monographs on liquid crystals has been put in **Appendix A**. Most of the results incorporated in this dissertation have already been published in different international scientific journals and also been presented in conferences and seminars, a list of which is given in **Appendix B**.



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'It is the city of mirrors, the city of mirages, at once solid and liquid at once air and stone'

Erica Jong.