

## CONTENTS

<b>Chapter I Introduction</b> .....	1
1.1. Antiquity and Development of Liquid Crystals .....	2
1.2. Birefringence in Liquid Crystals .....	3
1.3. Classification of Liquid Crystals .....	3
1.3.1 Thermotropic liquid crystals:.....	3
1.3.2 Lyotropic liquid crystals:.....	11
1.4. Impact of Chemical Composition on Mesophase Formation .....	11
1.4.1 Core region.....	11
1.4.2 Linking groups: .....	12
1.4.3 Terminal groups: .....	12
1.4.4 Lateral groups:.....	13
1.5. Identification of Liquid Crystals Phases .....	14
1.6. Applications of Liquid Crystals.....	15
1.6.1 Liquid Crystals Displays:.....	15
1.6.2 Temperature Sensors .....	15
1.6.3 Polymer-Dispersed Liquid Crystals (PDLCs): .....	15
1.6.4 Medical Applications: .....	16
1.6.4 Cosmetics .....	16
1.7. Other Uses of Mesogenic Materials .....	17
1.8. Biologically active compounds .....	17
1.9. References.....	23
<b>Chapter II Thiadiazole derivatives having azomethine linkages</b> .....	28
Synthesis, characterization, and mesomorphic behaviour of novel thiadiazole derivatives having azomethine linkages.....	29
2.1. Introduction.....	29
2.2. Experimental Section.....	35
2.2.1 Materials and Measurements .....	35
2.2.2 Synthesis and Characterization.....	36
2.3. Results and Discussion.....	60
2.3.1 Texture analysis of series-I and II [(4a-4l) and (5a-5l)].....	63
2.3.2 Thermal properties of series-I and II [(4a-4l) and (5a-5l)] .....	66
2.3.3 Structure mesomorphic relationship.....	72
2.4. References.....	77
<b>Chapter III Nematogenic Coumarin derivatives</b> .....	84

---

3.1. Introduction.....	85
3.2. Experimental Section.....	92
3.2.1 Materials and Measurements .....	92
3.2.2 Synthesis and Characterization.....	93
3.3. Results and Discussion.....	108
3.3.1 Photophysical studies, and TGA .....	109
3.3.2 Mesomorphic properties of compounds (6a-6m) of Series-I .....	111
3.3.3 DSC of compounds 6a, 6e, and 6h.....	115
3.3.4 DFT Calculations and mesomorphic comparison.....	116
3.3.5 Frontier Molecular Orbitals (FMOs) .....	119
3.3.6 Molecular Electrostatic Potentials (MEP).....	119
3.3.7 XRD Diffraction study .....	120
3.2.1 Structure-mesomorphic property relationship .....	121
3.3.9 Antibacterial activity.....	124
3.4. References.....	126
<b>Chapter IV Unsymmetrical nematogenic mesogens .....</b>	<b>135</b>
4.1. Introduction.....	136
4.1.1 Effect of the Core .....	139
4.1.2 Effect of Linking Groups: .....	140
4.1.3 Effect of Terminal Substituents: .....	142
4.1.4 Effect of Lateral Substituents: .....	143
4.2. Experimental Section.....	144
4.2.1 Materials and Measurements .....	144
4.2.2 Synthesis and Characterization.....	146
4.3. Results and Discussion.....	162
4.3.1 Texture Analysis of Series-I.....	165
4.3.2 Thermal properties of Series-I.....	166
4.3.3 Structure-mesomorphic relationship .....	171
4.4. References.....	173
<b>Chapter V Biologically active Oxazolone derivatives .....</b>	<b>180</b>
5.1. Introduction.....	181
5.2. Experimental Section.....	188
5.2.1 Materials and Measurements .....	188
5.2.2 Synthesis and Characterization.....	189
5.3. Results and Discussion.....	205

---

5.3.1 Chemistry .....	205
5.3.2 Mesomorphic Study of Novel Synthesized Compounds.....	208
5.3.3 Antibacterial activity.....	209
5.3.4 Seed Infusion Technique (Cytotoxicity) .....	210
5.4. References.....	213
<b>Summary &amp; Conclusions .....</b>	<b>218</b>
Chapter I.....	219
Chapter II.....	219
Chapter III.....	221
Chapter IV.....	223
Chapter V.....	224
<b>Conferences / Symposiums / Quiz / Seminars / Training / Poster / Oral Presentations .....</b>	<b>226</b>
<b>List of Publications related to the Thesis .....</b>	<b>228</b>
<b>Additional Publications non-related to the Thesis.....</b>	<b>228</b>