

## Contents

SUPPLEMENTS .....	ii
CONTRIBUTORS TO SUPPLEMENT 14 .....	vii
PREFACE .....	ix

### Macromolecules and Liquid Crystals: Reflections on Certain Lines of Research

P. G. DE GENNES

I. Introduction .....	1
II. Sheet Structures of AB Copolymers .....	5
III. Dilute Micelles of AB Copolymers .....	9
IV. One Ideal Chain in a Layered System .....	11
V. A Real Chain in a Layered System .....	14
VI. Conclusions .....	15

### Liquid-Crystal Synthesis for Physicists

P. KELLER AND L. LIEBERT

I. Introduction .....	20
II. A General Presentation .....	22
III. Schiff's Bases .....	23
IV. <i>p-p'</i> -Disubstituted Azoxybenzene .....	48
V. Esters .....	54
VI. Purification .....	70
VII. Conclusion .....	75

### Elasticity of Nematic Liquid Crystals

H. J. DEULING

I. Introduction .....	77
II. Freedericksz Transition in Nematics .....	79
III. Flexo-electric Effects .....	92
IV. Observation of Distortion and Determination of Material Constants .....	96
V. Dynamics of the Freedericksz Transition .....	103

### The Dielectric Permittivity of Liquid Crystals

W. H. DE JEU

I. Introduction	109
II. The Static Permittivity of Nematic Liquid Crystals	113
III. Permittivity and Molecular Structure	122
IV. The Influence of Smectic Order on the Static Permittivity	130
V. Dynamic Behavior of the Permittivity	136

### Instabilities in Nematic Liquid Crystals

E. DUBOIS-VIOLETTE, G. DURAND, E. GUYON, P. MANNEVILLE, AND P. PIERANSKI

I. Introduction	147
II. Linear Hydrodynamics of Isotropic and Nematic Liquids	148
III. Bénard-Rayleigh Thermal Convection in Isotropic Fluids	153
IV. Thermal Convection in Nematics	156
V. Hydrodynamic Instabilities in Nematics	167
VI. Electrohydrodynamic (EHD) Instabilities in Nematics	188
Appendix: Analog Simulation of Linear Instabilities	205

### Lyotropic Liquid Crystals: Structures and Molecular Motions

JEAN CHARVOLIN AND ANNETTE TARDIEU

I. Introduction	209
II. Structural Polymorphism	211
III. Local Behavior of Lipids	225
IV. Final Comment	256

### Liquid Crystals and Their Analogs in Biological Systems

Y. BOULIGAND

I. Introduction	259
II. Historical Summary	262
III. Smectics and Related Systems in Cells and Tissues	267
IV. Nematics, Cholesterics and Their Analogs	274
V. Mesomorphism and Morphogenesis	289
VI. Conclusions	293

AUTHOR INDEX	295
SUBJECT INDEX	302