

CONTENTS

1	Introduction to liquid crystal polymers	1
1.1	Introduction	1
1.2	Liquid crystal mesophases	5
1.3	Identification miscibility of known mesogens	7
1.4	Molecular architecture in thermotropic main chain LCPs	10
1.5	Lyotropic main chain LCPs	16
1.6	Formation of nematic mesophases	23
1.7	Conclusion	26
2	Theoretical aspects of the flow of crystal polymers	30
2.1	Introduction	30
2.2	Molecular orientation	31
2.3	Slow flows – the linear situation	34
2.4	Nonlinear behavior – negative normal stresses	37
2.5	Defects and polydomains	39
2.6	Flow-induced orientation	44
	References	48
3	Hamiltonian modelling of liquid crystal polymers and blends	49
3.1	Introduction	49
3.2	Family of mutually – Casmir equation	50
3.3	Molecular simulations	65
3.4	Blends	78
3.5	Concluding remarks	80
3.6	List of symbols	81
	References	83
4	Rheology and processing of liquid crystal polymer melts	86
4.1	Introduction	86
4.2	Some characteristics of thermotropic polyesters	94
4.3	Rheology	99
4.4	Processing with thermotropic melts	121
4.5	Conclusions	126

5	Rheology and relaxation behavior of filled LC-thermoplastics and their blends	135
5.1	Introduction	135
5.2	Experimental	137
5.3	Results and discussion	141
5.4	Conclusion	180
	References	183
6	The morphology and rheology of liquid crystal polymer blends	185
6.1	Introduction	185
6.2	Results for capillary flows	187
6.3	Summary of results of capillary flows	200
6.4	Models to explain viscosity minima	200
6.5	Elongational flows	207
6.6	Dynamic measurements	208
6.7	Conclusion (capillary flows)	209
6.8	Conclusion (other flows)	213
	References	214
7	Processing of liquid crystal polymers and blends	218
7.1	Introduction	218
7.2	Structure of LCPs	220
7.3	Processing of LCPs	225
7.4	Other developments	245
	References	246
8	Time-dependent effects in lyotropic systems	251
8.1	Introduction	251
8.2	Commonly investigated lyotropics	253
8.3	Time-dependent effects during shear flow	259
8.4	Time-dependent effects upon cessation of shear flow	272
9	Processing and properties of rigid rod polymers and their molecular composites	288
9.1	Introduction	288
9.2	Lyotropic LCPs	290
9.3	Molecular composite systems	298
9.4	Recent developments	308
	References	310
	Index	312