

Contents

<i>Preface to second edition</i>	<i>page ix</i>
<i>Preface to first edition</i>	<i>xi</i>
1 Introduction	1
1.1 Background	1
1.2 Structure of disordered chains and the liquid state	3
1.3 The ordered polymer chain	8
1.4 Morphological features	14
References	22
2 Fusion of homopolymers	24
2.1 Introduction	24
2.2 Nature of the fusion process	27
2.3 Fusion of the <i>n</i> -alkanes and other oligomers	35
2.4 Polymer equilibrium	49
2.5 Nonequilibrium states	64
References	67
3 Polymer–diluent mixtures	70
3.1 Introduction	70
3.2 Melting temperature: concentrated and moderately dilute mixtures	70
3.3 Crystallization from dilute solution: flexible chains	87
3.4 Helix–coil transition	96
3.5 Transformations without change in molecular conformation	103
3.6 Chemical reactions: melting and compound formation	110
References	117
4 Polymer–polymer mixtures	122
4.1 Introduction	122
4.2 Homogeneous melt: background	123

viii	<i>Contents</i>	
4.3	Two chemically identical polymers differing in molecular weight	132
4.4	Crystallization from a heterogeneous melt	135
	References	138
5	Fusion of copolymers	141
5.1	Introduction	141
5.2	Equilibrium theory	142
5.3	Nonequilibrium considerations	154
5.4	Experimental results: random type copolymers	156
5.5	Branching	193
5.6	Alternating copolymers	195
5.7	Block or ordered copolymers	200
5.8	Copolymer–diluent mixtures	224
	References	227
6	Thermodynamic quantities	236
6.1	Introduction	236
6.2	Melting temperatures, heats and entropies of fusion	236
6.3	Entropy of fusion	310
6.4	Polymorphism	319
	References	327
7	Fusion of cross-linked polymers	337
7.1	Introduction	337
7.2	Theory of the melting of isotropic networks	339
7.3	Melting temperature of networks formed from random chains	342
7.4	Melting temperature of networks formed from axially ordered chains	346
7.5	Melting temperature of networks formed from randomly arranged crystallites	348
7.6	Melting of network–diluent mixtures	351
7.7	Fibrous proteins	354
	References	355
8	Oriented crystallization and contractility	357
8.1	Introduction	357
8.2	One-component system subject to a tensile force	360
8.3	Multicomponent systems subject to a tensile force	381
8.4	Oriented crystallization and contractility in the absence of tension	389
8.5	Contractility in the fibrous proteins	395
8.6	Mechanochemistry	403
	References	408
	<i>Author index</i>	411
	<i>Subject index</i>	426