

Table of Contents

Compositions with Mineralorganic Fillers	
G. R. Barshtein, O. Y. Sabsai	1
Compositions Based on Aminoresins	
J. P. Terent'eva, M. L. Fridman	29
Functionalized Oligomers and Polymers as Stabilizers for Conventional Polymers	
J. Pospišil	65
Degradation and Stabilization of Ethylene-Propylene Copolymers and Their Blends: A Critical Review	
S. Sivaram, R. P. Singh	169
Rheokinetics of Curing	
A. Y. Malkin, S. G. Kulichkhin	217
Author Index Volume 101	259
Subject Index	261

Compositions with Mineralorganic Fillers

List of Symbols	2
1 Introduction	3
2 Mineralorganic Fillers	4
3 Isothermal Flows	6
3.1 Superposition of the Flows' Curve	6
3.2 Pressure Losses at the Channel Entrance	8
3.3 Piezoeffects in a Melted Field Polymer Flow	9
3.4 Conditions of Transfer to an Irregular Flow Regime	10
3.5 Specific Effects in Isothermal Flow	13
4 Crystallization Kinetics	14
5 Thermophysical Properties	18
6 Non-Isothermic Flow	20
7 Production of Mineralorganic-Material-Filled Thermoplastic Foam Items	22
8 Conclusions	24
9 References	25

Compositions Based on Aminoacids

1 Aminoplasts in General and Their Modifications	30
1.1 Preparing Compositions Based on Aminoacids	30
1.2 Fillers	30
1.3 Types of Aminoplast Made in the USSR	31
1.4 Modification of Aminoplasts	31
2 Applications of Aminoplasts	36
3 Methods of Appraising the Technological Properties of Aminoplasts	38
3.1 Rheological Methods	38
3.1.1 Rotational Methods	39
3.1.2 Capillary Methods	44
3.2 The Primary Assessment of Rheological Properties	46
3.3 Chemio-Physical Methods	48
4 Methods of Processing Aminoplasts	50
4.1 Pressing	50
4.2 Cast pressing	53
4.3 Pressure casting	54
4.4 Extrusion	57
5 Physico-Mechanical and Dielectric Indices of Aminoplasts Which Are of Importance for the Performance of Various Articles	59
6 References	63

Functionalized Oligomers and Polymers as Stabilizers for Conventional Polymers

List of Abbreviations and Symbols	66
Preface	68
1 Stabilization of Polymers Against Environmental Attacks	68
1.1 Additive Systems as Stabilizers	68
1.2 Inherent Chemical Efficiency of Stabilizers	69
1.2.1 Cooperation Between Different Stabilizing Functions	69
1.3 Physical Factors Limiting the Inherent Chemical Efficiency of Stabilizers	70
1.3.1 Physical Loss of Stabilizers due to Volatility and Leaching	71
1.3.2 Physical Relations Between Stabilizers and the Polymer Matrix	73
1.3.2.1 Solubility and Compatibility of Stabilizers	73
1.3.2.2 Diffusion of Stabilizers	74
2 Enhancement of the Physical Persistency of Stabilizers	75
2.1 Salts and Metallic Complexes	75
2.2 Stabilizers with Increased Molecular Weights	76
3 Synthesis of Physically Persistent Stabilizers Based on Functionalized Oligomers and Polymers	79
3.1 Polyreactions	79
3.1.1 Polymerization	80
3.1.1.1 Functionalized Monomers with Polymerizable Multiple Bonds $C=C$	80

3.1.1.2	Ring-Opening Polymerization of Functionalized Heterocycles	97
3.1.2	Polyaddition	97
3.1.3	Polycondensation	99
3.1.3.1	Functionalized Products of Autocondensation and Oxidative Coupling	100
3.1.3.2	Functionalized Polysiloxanes	102
3.1.3.3	Functionalized Condensates of Oxocompounds	103
3.1.3.4	Functionalized Condensates of Sulfur Chlorides	105
3.1.3.5	Functionalized Polyethers	106
3.1.3.6	Functionalized Polyesters	107
3.1.3.7	Functionalized Polycarbonates	110
3.1.3.8	Functionalized Polyamines	111
3.1.3.9	Functionalized Polyamides and Related Polymers	112
3.1.3.10	Systems with Organometallic Moieties	114
3.2	Reactions on Polymers	114
3.2.1	Grafting onto Conventional Polymers	114
3.2.2	General Chemical Methods	116
3.2.2.1	Reactions of Conventional Polymers with Low Molecular Weight Compounds Carrying Stabilizing Moieties	117
3.2.2.2	Reactions of Polymers Bearing Reactive Groups with Low Molecular Weight Compounds Carrying Stabilizing Moieties	130
3.2.3	Intramolecular Rearrangements of Polymers Bearing Precursors of Stabilizing Moieties	143
4	Properties of Oligomeric and Polymeric Stabilizers	145
4.1	Areas of Use	150
4.2	Stabilizing Activity and Mechanisms	152
4.2.1	Combinations of Polymeric and High Molecular Weight Stabilizers	158
5	Conclusions	159
6	References	160

Degradation and Stabilization of Ethylene-Propylene Copolymers and Their Blends: A Critical Review*

1 Introduction	171
1.1 Thermoplastic Copolymers	171
1.1.1 Random Copolymers	171
1.1.2 Block/Heterophasic Copolymers	171
1.2 Elastomeric Copolymer	173
1.3 Thermoplastic Elastomer	173
1.4 Methods of Synthesis	173
2 Degradation of Polymers	174
2.1 Initiators of Degradation	174
2.2 General Mechanism of Degradation	175
2.2.1 Initiation	175
2.2.2 Propagation	175
2.2.2.1 Formation of Polymer Hydroperoxide	175
2.2.2.2 Decomposition of Polymer Hydroperoxide	176
2.2.2.3 Formation of Hydroxyl Group	176
2.2.2.4 Decomposition of Carbonyl Group	176
2.2.3 Termination	177

* NCL Communication No. 4904

3 Degradation of Ethylene-Propylene Copolymers	177
3.1 Thermoplastic E-P Copolymers	177
3.2 Elastomeric E-P Copolymers (EPR)	179
3.3 Thermoplastic Elastomers	187
4 Mechanisms of Ethylene-Propylene Copolymer Stabilization	187
4.1 Light Screeners	187
4.2 Ultra-Violet Absorbers	190
4.3 Antioxidants	191
4.4 Peroxide Decomposers	195
4.5 Nucleating Agents/Fillers	197
4.6 Radical Scavengers/Free-Radical Traps	198
4.7 Excited-State Quenchers	201
4.7.1 Energy Transfer	201
4.7.2 Formation of the Excited-State Complex	202
4.8 Combined Effect/Synergism	204
5 Degradation and Stabilisation of E-P Blends	206
6 Future Developments	210
7 References	210

Rheokinetics of Curing

1 Introduction	218
2 Gel Point Determination	219
3 Viscometry of Curing	222
3.1 The Increase of Viscosity near the Gel Point	222
3.2 Microphase Segregation in Reactive Systems	230
4 Curing After the Gel Point	241
4.1 Rheology and Other Methods of Investigating the Kinetics of Curing	241
4.2 Physical Model of Network Formation	243
4.3 Rheokinetic Equations of Curing	246
5 Rheokinetic Analysis under Optimization of Processing	252
6 Conclusion	253
7 References	254