


Dobb, M. G. and McIntyre, J. E.: Properties and Applications of Liquid-Crystalline Main-Chain Polymers. Vol. 60/61, pp. 61–98.

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Volume(s)</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eisenberg, A.</td>
<td>Ionic Forces in Polymers</td>
<td>Vol. 5</td>
<td>59-112</td>
</tr>
<tr>
<td>Elsner, G., Riekel, Ch. and Zachmann, H. G.</td>
<td>Synchrotron Radiation Physics.</td>
<td>Vol. 67</td>
<td>1-58</td>
</tr>
<tr>
<td>Elyashevich, G. K.</td>
<td>Thermodynamics and Kinetics of Orientational Crystallization of Flexible-Chain Polymers.</td>
<td>Vol. 43</td>
<td>207-246</td>
</tr>
<tr>
<td>Enkelmann, V.</td>
<td>Structural Aspects of the Topochemical Polymerization of Diacetylenes.</td>
<td>Vol. 63</td>
<td>91-136</td>
</tr>
<tr>
<td>Finkelmann, H. and Rehage, G.</td>
<td>Liquid Crystal Side-Chain Polymers.</td>
<td>Vol. 60/61</td>
<td>99-172</td>
</tr>
<tr>
<td>Fischer, H.</td>
<td>Freie Radikale während der Polymerisation, nachgewiesen und identifiziert durch Elektronenspinresonanz.</td>
<td>Vol. 5</td>
<td>463-530</td>
</tr>
<tr>
<td>Flory, P. J.</td>
<td>Molecular Theory of Liquid Crystals</td>
<td>Vol. 59</td>
<td>1-36</td>
</tr>
<tr>
<td>Ford, W. T. and Tomoi, M.</td>
<td>Polymer-Supported Phase Transfer Catalysts Reaction Mechanisms.</td>
<td>Vol. 55</td>
<td>49-104</td>
</tr>
<tr>
<td>Fujita, H.</td>
<td>Diffusion in Polymer-Diluent Systems.</td>
<td>Vol. 3</td>
<td>1-47</td>
</tr>
<tr>
<td>Funke, W.</td>
<td>Über die Strukturaufklärung vernetzter Makromoleküle, insbesondere vernetzter Polyesterharze, mit chemischen Methoden.</td>
<td>Vol. 4</td>
<td>157-235</td>
</tr>
<tr>
<td>Gal'braikh, L. S. and Rigovin, Z. A.</td>
<td>Chemical Transformation of Cellulose.</td>
<td>Vol. 14</td>
<td>87-130</td>
</tr>
<tr>
<td>Galli, G.</td>
<td>see Chiellini, E.</td>
<td>Vol. 62</td>
<td>143-170</td>
</tr>
<tr>
<td>Gallot, B. R. M.</td>
<td>Preparation and Study of Block Copolymers with Ordered Structures.</td>
<td>Vol. 29</td>
<td>85-156</td>
</tr>
<tr>
<td>Gerrens, H.</td>
<td>Kinetik der Emulsionspolymerisation.</td>
<td>Vol. 1</td>
<td>234-328</td>
</tr>
<tr>
<td>Goethals, E. J.</td>
<td>The Formation of Cyclic Oligomers in the Cationic Polymerization of Heterocycles.</td>
<td>Vol. 23</td>
<td>103-130</td>
</tr>
<tr>
<td>Graessley, W. W.</td>
<td>The Entanglement Concept in Polymer Rheology.</td>
<td>Vol. 16</td>
<td>1-179</td>
</tr>
<tr>
<td>Grebowicz, J. see Wunderlich, B.</td>
<td>see Wunderlich, B.</td>
<td>Vol. 60/61</td>
<td>1-60</td>
</tr>
<tr>
<td>Hagihara, N., Sonogashira, K. and Takahashi, S.</td>
<td>Linear Polymers Containing Transition Metals in the Main Chain.</td>
<td>Vol. 41</td>
<td>149-179</td>
</tr>
<tr>
<td>Hasegawa, M.</td>
<td>Four-Center Photopolymerization in the Crystalline State.</td>
<td>Vol. 42</td>
<td>1-49</td>
</tr>
<tr>
<td>Hay, A. S.</td>
<td>Aromatic Polyethers.</td>
<td>Vol. 4</td>
<td>496-527</td>
</tr>
<tr>
<td>Heitz, W.</td>
<td>Polymeric Reagents. Polymer Design, Scope, and Limitations.</td>
<td>Vol. 23</td>
<td>1-23</td>
</tr>
<tr>
<td>Helfferich, F.</td>
<td>Ionenaustausch.</td>
<td>Vol. 1</td>
<td>329-381</td>
</tr>
<tr>
<td>Hendra, P. J.</td>
<td>Laser-Raman Spectra of Polymers.</td>
<td>Vol. 6</td>
<td>151-169</td>
</tr>
<tr>
<td>Hendrix, J.</td>
<td>Position Sensitive &quot;X-ray Detectors&quot;</td>
<td>Vol. 67</td>
<td>59-98</td>
</tr>
</tbody>
</table>


Lustoh, J. and Vašš, F.: Anionic Copolymerization of Cyclic Ethers with Cyclic Anhydrides. Vol. 56, pp. 91–133.


McIntyre, J. E. see Dobb, M. G. Vol. 60/61, pp. 61–98.


Platé, N. A. see Shibaev, V. P. Vol. 60/61, pp. 173–252.


Rehage, G. see Finkelmann, H. Vol. 60/61, pp. 99-172.


Semlyen, J. A.: Ring-Chain Equilibria and the Conformations of Polymer Chains. Vol. 21, pp. 41-75.


Subject Index

AB-block copolymers
- of aziridine and styrene 279
- of 3,3-bis(chloromethyl)oxetane and 1,3-dioxolane 275
- of 3,3-bis(chloromethyl)oxetane and tetrahydrofuran 75, 275
- of 1,3-dioxolane and p-methylstyrene 273
- of oxazoline and styrene 272

ABA-block copolymers
- of 1,3-dioxepane and 1,2-dimethoxyethylene 279
- of 1,3-dioxepane and 1,3-dioxolane, attempted 277
- of epichlorohydrin and tetrahydrofuran 64
- of tetrahydrofuran and siloxanes 276

Acetals, see cyclic acetals

Acid catalysed polymerization
- of bicyclic orthoesters 166
- of cyclic amines 187
- of cyclic siloxanes 217, 222
- of cyclic sulfides 187
- of 1,3-dioxolane 97, 98
- of ethylene oxide 59, 63
- of lactams 203, 205
- of tetrahydrofuran 80
- of 1,3,5-trioxane 101, 106

Activated monomer mechanism
- in 1,3-dioxolane polymerization 99
- in oxiranes polymerization 63
- in lactams polymerization 202

2-Alkoxy-1,3,2-dioxaphospholane
- polymerization of 231

Alkylhydrocyclosiloxanes
- polymerization of 218

2-Alkyl-2-oxo-1,3,2-dioxaphospholanes 227

Alternating copolymers 259
- by zwitterionic polymerization 259, 262
- from monomers unable to homopolymerize 266

Amidines
- formation in lactams polymerization 204

Anhydrosugars
- copolymerization of 152
- polymerization of 139, 150
- structures of 141
- stereochemistry of polymerization 146

1,4-Anhydro-2,3-di-o-methyl-α-L-arabinopyranose
- polymerization of 144

1,6-Anhydro-β-D-glucopyranose 119, 154
5,6-Anhydro-1,2-α-isopropylidene-β-D-glucopyranose
- polymerization of 143
3,5-Anhydro-1,2-α-isopropylidene-β-D-xylopyranose
- polymerization of 143

1,2-Anhydro-3,4,6-tri-o-acetyl-β-D-glycopyranose
- polymerization of 142

1,6-Anhydro-2,3,5-tri-o-benzyl-β-D-galactofuranose
- polymerization of 145

1,6-Anhydro-2,3,4-tri-o-benzyl-β-D-galactopyranose
- copolymerization of 152

1,4-Anhydro-2,3,6-tri-o-methyl-β-D-galactopyranose
- polymerization of 144

1,4-Anhydro-2,3,6-tri-o-benzyl-α-D-glycopyranose
- polymerization of 144, 148

1,6-Anhydro-2,3,4-tri-o-benzyl-β-D-glycopyranose
- polymerization of 145, 149, 150
- copolymerization of 152

1,6-Anhydro-2,3,4-tri-o-benzyl-β-D-mannopyranose
- copolymerization of 153

Antepenultimate effect
- in reversible copolymerization of tetrahydrofuran 250, 270

Antiperiplanar rules
- in lactams polymerization 204

Azetidines
- polymerization of 188
- reactivity ratios in copolymerization 245

Aziridines
- alkyl halide initiated (covalent) polymerization 189, 192
- alternating copolymerization 266
- block copolymers 271
Subject Index

-- 1-t-butyl, star-shaped polymers of 283
-- chain branching in polymerization 186, 195
-- cyclic oligomers formation 36, 192
-- grafting onto silica 291
-- polymerization of 187
-- zwitterionic polymerization of 43, 260, 265

Back-biting in polymerization
-- of t-butyloxirane 45
-- of cyclic amines 192
-- of cyclic siloxanes 48, 218
-- of cyclic sulfides 192, 198
-- of 1,3-dioxolane 39
-- of oxiranes 35, 53, 58, 60, 61
-- of oxetanes 46, 73
-- of tetrahydrofuran 47
-- of 1,3,5-trioxane 133
-- theory of 39

Basicity
-- of cyclic ethers 256
-- of cyclic sulfides 246
-- of lactones 256
-- of substituted oxiranes 18

Bicyclic acetals
-- polymerization of 154

Bicyclic monomers
-- copolymerization of 31
-- polymerization of 140
-- thermodynamics of polymerization 140

Bicyclic orthoesters
-- polymerization of 165

Bifunctional initiators 280

3,3-Bis(chloromethyl)oxetane
-- block copolymers with 1,3-dioxolane 75, 275
-- block copolymers with tetrahydrofuran 75, 275
-- copolymerization with e-caprolactone 256
-- copolymerization with lactones 186, 256
-- copolymerization with β-propiolactone 257
-- copolymerization with tetrahydrofuran 250, 269
-- copolymerization with tetrahydroxypuran 31
-- cyclic oligomers formation 74
-- polymerization of 68
-- polymer properties 76
-- radiation polymerization of 74
-- reactivity ratios in copolymerization 245
-- solid-state polymerization of 74
-- synthesis of 67

Block copolymers 270
-- by living ends transformation 283
-- of styrene and tetrahydrofuran 284
-- by sequential polymerization
  -- of cyclic acetals 277
  -- of 1,3-dioxolane and 3,3-bis(chloromethyl)oxetane

-- of 1,3-dioxopane and 1,2-dimethoxyethylene
-- of epichlorohydrin and tetrahydrofuran 64
-- of p-methoxystyrene and 1,3-dioxolane 273
-- of oxazolines and tetrahydrofuran 213
-- of oxazolines 276
-- of styrene and aziridines 271
-- of styrene and oxazolines 272
-- of tetrahydrofuran and 3,3-bis(chloromethyl)oxetane
-- of tetrahydrofuran and siloxanes 276

Bond angles
-- in cyclic monomers 15, 16

Bond lengths
-- in cyclic monomers 15, 16

4-Bromo-6,8-dioxabicyclo[3.2.1]octane
-- polymerization of 158

1-t-Butylaziridine
-- cyclic oligomers formation 50, 193
-- grafting onto silica 291
-- polymerization of 188
-- star-shaped polymers of 283
-- zwitterionic alternating copolymerization with β-propiolactone 265

1-t-Butyloxirane
-- cyclic tetramer formation 45

1-t-Butylperoxy-2,3-epoxypropane polymerization of 54

e-Caprolactam 201, 208

e-Caprolactone 177
-- copolymerization with 3,3-bis(chloromethyl)oxetane 256
-- properties of polymer 184

Carbenium ions as active species
-- in anhydrosugars polymerization 147
-- in cyclic acetals polymerization 29, 258
-- in 1,3,5-trioxane polymerization 108

Carbenium salts as initiators
-- of cyclic sulfides polymerization 187
-- of 1,3-dioxolane polymerization 96
-- of oxetane polymerization 71
-- of oxiranes polymerization 53

Carbon dioxide
-- alternating copolymers with aziridines 266

Ceiling temperature 4
-- in cyclic acetals polymerization 92

Celcon® 99

Chain ends structure in polymers
-- of cyclic acetals 43
-- of cyclic esters of phosphoric acid 232
-- of 1,3-dioxolane
-- of lactones 178
-- of oxiranes 63
-- of tetrahydrofuran 80, 85
Subject Index

— of 1,3,5-trioxane 107

Chain transfer
— to chain transfer agent in polymerization
— of tetrahydrofuran 86
— of 1,3,5-trioxane 117
— to polymer in polymerization
— of cyclic acetics 277
— of cyclic ethers of phosphoric acid 232
— of oxetanes 72
— of 1,3,5-trioxane 119

Cocatalysis in initiation of polymerization of
— 3,3-bis(chloromethyl)oxetane 68
— 1,3,5-trioxane 105

Conformations
— of anhydrosugars 153
— of bicyclic monomers 148
— of cyclic acetics 19
— of cyclic monomers 15
— of polymer chains 44

Conidine
— zwitterionic copolymerization with lactones 260

Copolymerization above ceiling temperature 32, 267

Copolymerization equation 27, 236
— for reversible copolymerization 249

Counterion stability 96, 122, 181, 193, 209

Crown-ethers
— formation in ethylene oxide polymerization 46, 59

Crystalline state
— polymerization in 11, 12
— polymerization of 3,3-bis(chloromethyl)-oxetane in 74
— polymerization of 1,3,5-trioxane in 74, 108, 193

Crystallinity
— of polyoxymethylene 111

1-(2-Cyanoethyl)aziridine
— polymerization of 188, 193
1-(2-Cyanoethyl)azetidine
— polymerization of 188

Cyclic acetics
— cyclic oligomer formation 37, 43, 50
— polymerizability of 92
— polymerization of 92
— synthesis of 92
— thermodynamics of polymerization 19, 20, 25

Cyclic amines
— cyclic oligomer formation 36, 46, 192
— polymerization of 189
— properties of polymers 194
— reactivity ratios in copolymerization 245

Cyclic esters of phosphoric acid
— copolymerization of 234
— polymerization of 12, 228
— thermodynamics of polymerization 21

Cyclic ethers see oxiranes, oxetanes, tetrahydrofuran

Cyclic imino-ethers (see also oxazolines) 209
— applications of polymers 213
— copolymerization of 213
— polymerization of 210, 211

Cyclic oligomers
— kinetic control 48
— in polymerization of
— 3,3-bis(chloromethyl)oxetane 73
— cyclic acetics 92
— cyclosiloxanes 218
— in zwitterionic copolymerization 265

Cyclic sulfides
— cyclic oligomers formation
— degradation of polymers
— polymerization of 189
— properties of polymers 197
— reactivity ratios in copolymerization 245

Delrin® 99, 111

Depolymerization
— of polyoxymethylene 99, 120

Depropagation-propagation equilibria 4, 6
— in copolymerization 28
— in polymerization of 1,3,5-trioxane 112

1,4-Dialkylpiperazine
— formation in polymerization of 1-alkylaziridines 192

1,4-Dichloro-2,3-epoxybutane
— copolymerization of cis- and trans-isomers 58
— polymerization of 57
— stereochemistry of polymerization 58

1,2-Dimethoxylethylene
— block copolymers with 1,3-dioxepane 279

3,9-Dimethylene-1,5,7,11-tetraoxaspiro[5.5]-undecane
— polymerization of with volume expansion 3,3-Dimethyloxetane
— copolymerization with oxetane 241
— cyclic oligomers formation 73
— polymerization of 69

1,1-Dimethylethirane (isobutylene oxide)
— cyclic oligomers formation 61
1,2-Dimethylethirane
— polymerization of 56

6,8-Dioxabicyclo[3.2.1]octane 139, 146
— polymerization of 154
— polymerization of diastereoisomers of 159
— stereochemistry of polymerization 155

6,8-Dioxabicyclo[3.2.1]octane
— polymerization of 160
— stereochemistry of polymerization 162

7,9-Dioxabicyclo[4.3.0]nonane
— polymerizability of 23

1,4-Dioxane
312 Subject Index

--- formation in ethylene oxide polym. 58, 59
--- polymerizability of 93
1,3-Dioxepane
--- block copolymers with 1,2-dimethoxyethylene 279
--- polymerization of 99
--- thermodynamics of polymerization 30
1,3-Dioxolane
--- block copolymers with
  - 3,3-bis(chloromethyl)oxetane 75, 275
  - p-methoxystyrene 273
  - styrene 275
--- copolymerization with
  - isoprene 134, 258
  - styrene 133, 258
  - tetrahydrofuran 252
  - 1,3,5-trioxane 120, 125
--- cyclic oligomers formation 36, 39, 40
--- hydride transfer in polymerization of 96
--- polymerization of 93
--- thermodynamics of polymerization 8, 19, 20, 25
--- transacetalization in polymerization of 120
12-Dodecanolactam
--- polymerization of 202
Duracon® 135
Dyad distribution
  - in 1,4-dichloro-2,3-epoxybutene polymers 58
  - in 1,3,5-trioxepane polymers
Enthalpy of polymerization 2, 4, 5, 14
--- methods of determination 12, 13, 14
--- of 1,3-dioxpane polym. 30
--- of 1,3-dioxolane polym. 25
--- of tetrahydrofuran polym. 24
--- of 1,3,5,7-tetraoxocane polym. 113, 115
--- of 1,3,5-trioxane polym. 26, 113, 115
Entropy of polymerization 2, 4, 5, 17
--- methods of determination 12, 14
--- of 1,3-dioxpane polym. 30
--- of 1,3-dioxolane polym. 25
--- of tetrahydrofuran polym. 24
--- of 1,3,5,7-tetraoxocane polym. 113, 115
--- of 1,3,5-trioxane polym. 26, 113, 115
Empirical methods of ΔH and ΔS determination 14
End-capping 54
End-groups
  - determination by 1H-NMR 97
  - hydroxyl 53, 63, 80, 88, 105
  - determination by 19F-NMR 98
  - in end-to-end cyclization 49
  - in poly-1,3-dioxolane 97
  - in polytetrahydrofuran 80, 85, 89
End-to-end cyclization 35, 41, 43, 49, 187, 219
Epichlorohydrin
--- block copolymers with tetrahydrofuran 64
--- copolymerization
  - with tetrahydrofuran 31
  - with 1,3,5-trioxane 131
--- cyclic oligomers formation 35, 50, 53, 61
--- polymerization of 12, 52, 55
Epichlorohydrin rubbers 55
2,3-Epoxybutane
--- polymerization of 56
Ethylene oxide
--- block copolymers with tetrahydrofuran 64
--- copolymerization with 1,3,5-trioxane 131
--- cyclic oligomers formation 46, 58
--- polymerization of 54
--- by activated monomer mechanism 53, 63
Equilibrium monomer concentration 8, 9, 11, 12, 13
--- in copolymerization 28
--- in tetrahydrofuran polymerization 25
--- in 1,3,5-trioxane polymerization 27, 112, 115, 116
Equilibrium oligomer concentration 39, 40, 92
Expansion upon polymerization 163
Extended chain crystals
  - of polyoxymethylene 111
Folded chain crystals
  - of polyoxymethylene 111
Formaldehyde
  - as the product of hydrolysis of styrene-1,3-dioxolane copolymers 134
  - equilibria with polyoxymethylene chains 26, 112
  - equilibrium concentration of 116
  - polymerization of 99
  - thermodynamics of polymerization 113
Free energy of polymerization 2
Friedel-Crafts catalysts as initiators of polymerization
  - of anhydrosugars 142
  - of bicyclic monomers 154
  - of cyclic amines 159
  - of cyclic sulfides 189
  - of glycolide 183
  - of oxetanes 68
  - of oxiranes 54, 57, 58, 62
  - of 1,3,5-trioxane 105, 124
α-D-Galactopyranose 141, 142
Gel permeation chromatography
  - of ε-caprolactone oligomers 182
  - of epichlorohydrin oligomers 64
  - of 1,3,5-trioxane polymers 134
Genetic zwitterion 259
Glycolide
  - polymerization of 183
α,ω-Glycols
  - of polyacetals 98
Subject Index 313

— of poly(ethylene oxide) 63, 64
— of polytetrahydrofuran 81

Graft copolymers 287

Grafting from
— grafting of 2-methyloxazoline from chloromethylated polystyrene 213, 289
— from polybutadiene 213, 288
— grafting of tetrahydrofuran from epoxides 289
— from neoprene rubbers 288

Grafting onto
— grafting of aziridines onto silica 291
— grafting of tetrahydrofuran onto polymers with amino groups 290

Grafting through 292

Heats of polymerization (see also enthalpies of polymerization)
— of 1,3,5-trioxane 101

Herclor® 55
2,2,4,4,6,6-Hexamethylocyclotrisiloxane (D₃) 216
— cyclic oligomers formation 48, 218
— polymerization of 219, 220

Hostaform® 100

Hydride transfer (abstraction)
— in cyclic sulfides polymerization 187
— in 1,3-dioxolane polymerization 96
— in 1,3,5-trioxane polymerization 118, 119

Hydrolytic polymerization of lactams 201, 206

Hydron® 55

Hytyrel® 80

Hydroxy terminated polymers (see α,ω-glycols)

Ideal copolymerization, equation 237

Induction periods
— in 1,3,5-trioxane polymerization 116, 117

Industrial applications of
— polyamides 201
— poly(3,3-bis(chloromethyl)oxetane) 76
— polypepichlorohydrin 55
— polyethyleneimine 195
— polyglycolide 183
— polylactide 183
— polyoxymethylene 99
— polysaccharides 140
— polytetrahydrofuran diols 80

Initiation
— in anhydrosugars polymerization 151
— in cyclic amines polymerization 187
— in cyclic esters of phosphoric acid polymerization 227
— in cyclic sulfides polymerization 187
— in cyclic siloxanes polymerization 220, 222
— in 1,3-dioxolane polymerization 96
— in lactams polymerization 202, 203
— in lactones polymerization 177
— in oxazolines polymerization 209

— in oxetanes polymerization 68
— in tetrahydrofuran polymerization 81, 85
— in 1,3,5-trioxane polymerization

Isoprene
— copolymerization with 1,3-dioxolane 134, 258

Initiator fragments in polymers
— of cyclic acetics
— of lactones 178
— of tetrahydrofuran 281, 293

Inorganic rubbers — polyphosphazenes 226

Ion-trapping with phosphines 176

Isobutylene oxide polymerization 61

Isoprene
— copolymerization with 1,3-dioxolane 134, 258

Jacobson-Stockmayer theory of cyclization 38, 39, 47, 221

Kinetically controlled distribution of cyclic oligomers 46
— in cyclic siloxanes polymerization 48
— in tetrahydrofuran polymerization
— in triethylene glycol formal polymerization 44

Kinetic enhancement in macrocycles 44

Kinetics
— of copolymerization 121, 238, 253
— of cyclization 42
— of crystallization of polyoxymethylene 111
— of initiation of 1,3,5-trioxane polymerization
— of polymerization
— of cyclic siloxanes 220
— of oxetanes 68, 69, 70
— of tetrahydrofuran 82

Lactams
— mechanism of polymerization 203
— stereochemistry of polymerization 204

Lacctide
— polymerization of 183

Lactones
— copolymerization with 3,3-bis(chloromethyl)-oxetane 182
— copolymerization with cyclic ethers 181
— cyclic oligomers formation 181
— properties of polymers 183
— stereochemistry of polymerization 180

Lewis acids — see Friedel-Crafts catalysts

Living polymerization 274

Living polymers 270, 274
— of cyclic acetics 275, 277, 279
— of tetrahydrofuran 275, 281, 28

Macrocyclic population in polymerization of
— cyclic siloxanes 48
— 1,3-dioxolane 40

Macromonomers 292
Subject Index

- containing oxazoline rings 294
- from oxetanes 294
- from tetrahydrofuran 85, 87, 293

Maleic anhydride
- alternating copolymers with tetrahydrofuran 266

Melting point
- of oxetanes 67
- of poly-3,3-bis(chloromethyl)oxetane 77
- of poly(ethylene sulfide) 187
- of polyoxymethylene 111
- of 1,3,5-trioxane 100
- of 1,3,5-trioxane copolymers 129
- with 1,3-dioxolane 112, 130

p-Methoxystyrene
- block copolymers with 1,3-dioxolane 273
- 3-Methyl-3-chloromethyloxetane
  - copolymerization with heterocyclic monomers 243, 244
  - polymerization of 68
- reactivity ratios in copolymerization 243, 244

3-Methylene-1,5,7,11-tetraoxaspirol5.5l-
undecane 170
2-Methyl-2-oxazoline
- block copolymers with styrene 272
- grafting from chloromethylated polystyrene 289
- polybutadiene 288
- polymerization of 210, 212
- reactivity ratios in copolymerization 247

Microstructure
- of copolymers
  - of 3,3-bis(chloromethyl)oxetane and ε-caprolactone 256
  - of 1,3-dioxolane and 1,3-dioxepane 277
  - reactivity ratios from 239
- of cyclic sulfide polymers by degradation 197
- of lactone polymers by NMR 180
- of polycetals by NMR

Monomer-polymer equilibria 4, 6, 28, 112
Multifunctional initiators 280, 281

Nomenclature
- of anhydrosugars 146
- of bicyclic monomers 146

Non-polymerizable heterocyclic compounds 5, 6, 15, 20, 23
- copolymerization of 31, 32, 266

NMR spectroscopy
13C-NMR for determination of microstructure
- of bicyclic acetals polymers 159, 161
- of oxetanes polymers 76
- of oxetanes copolymers 257
- of polycetals 127, 277
- of polyethyleneimine 196
- of polylactide 180
- of spiroorthoesters polymers 172

19F-NMR
- for studying the mechanism of initiation by PF5 150

1H-NMR
- for determination of [M]0 13
- for determination of microstructure
  - of bicyclic acetals polymers 155, 161, 162
  - of bicyclic orthoesters polymers 165, 167
  - of oxetanes copolymers 242, 257
  - of polycetals 126
  - of polysaccharides 146
- for end-group determination in polycetals 97
- for studying the direction of β-propiolactone ring opening 178

31P-NMR
- for studying the direction of β-propiolactone ring opening 178
- for studying the mechanism of initiation by PF5 151

Nucleophilicity
- of cyclic amines and sulfides 188
- of heterocyclic monomers 274
- of tetrahydrofuran 25
2,2,4,4,6,6,8,8-Octamethylcyclotetrasiloxane (D₆) 216
- cyclic oligomers formation 218
- polymerization of 217, 219, 220

Oligodiols
- from cyclic acetals 98
- from epichlorohydrin 53, 63
- from tetrahydrofuran 80
- from tetrahydrofuran-oxirane copolymers 88
8-Oxabicyclo[4.3.0]nonane
- copolymerization of cis- and trans-isomers 31
- polymerizability of 23

Oxazolines
- applications of polymers 214
- block copolymers of 213, 276
- polymerization of 211
- reactivity ratios in copolymerization 246, 247

Oxazones 210
2-Oxazoline 209
- polymerization of 197, 212

Oxetanes
- copolymerization of 31, 241, 269
- cyclic oligomers formation 36, 46, 73
- microstructure of copolymers 241
- polymerization of 19, 66, 68, 76
- substituted, thermodynamics of polymerization 19
- synthesis of 66
- reactivity ratios in copolymerization

Oxocarbenium ions
- as active species in polymerization of β-
propiolactone 178
— as initiators of polymerization
  — of cyclic acetals 97
  — of tetrahydrofuran 85

Oxolanes (see Tetrahydrofuran)

Oxonium ions
— as active species in copolymerization 249, 253, 256, 258
— as active species in polymerization
  — of anhydrosugars 146
  — of bicyclic acetals 156
  — of cyclic acetals 98, 104
  — of oxetanes 69
  — of oxiranes 52, 63
  — of spiroorthoesters 172
  — of tetrahydrofuran 81
  — of 1,3,5-trioxane 108
— as initiators of polymerization
  — of cyclic acetals 97
  — of oxiranes 59

Oxiranes
— copolymerization of 130, 131
— cyclic oligomers formation 36, 50
— polymerization of 52
  — substituted
    — basicity of 18
    — thermodynamics of polymerization 18

1,3,5,7,9-Pentaoxadecane
— equilibria with polyoxymethylene chain 112

Pentaplast® 76
Penton® 76

Penultimate unit effect in copolymerization 31, 237, 238, 240

Phase transition 3

2-Phenyl-5,6-dihydro-4H-1,3-oxazine
— polymerization of 212

4-Phenyl-1,3-dioxane
— formation in styrene-1,3,5-trioxane copolymerization 132, 258

4-Phenyl-1,3-dioxolane
— polymerizability of 92
— polymerization of 94

2-Phenyl-1,2-oxaphospholane
— polymerization of 231

2-Phenyl-2-oxazoline
— polymerization of 212
— reactivity ratios in copolymerization 247

Phosphazenes
— polymerization of 226, 227

Polyethylenimine 187, 194, 195, 214
Poly(ethylene oxide)
— as agglomeration preventing agent in 1,3,5-trioxane polymerization 101

Polymerizability 3, 14
— of cyclic acetals 92
— of substituted
  — bicyclic monomers 22
— cyclic esters of phosphoric acid 21
— 1,3-dioxepanes 20
— 1,3-dioxolanes 19, 20
— oxetanes 19, 66
— oxiranes 18

Polymerization with volume expansion 140, 163

Polysaccharides 140
— structure of 141

Polysiloxanes 216
— alkylhydrocyclosiloxanes, polymerization of 218
— cyclic oligomers 218

Propagation
— by activated monomer mechanism
  — in cyclic acetals polymerization 63
  — in oxiranes polymerization 63
  — in cyclic acetals polymerization 107
  — in cyclic amines polymerization 191
  — in cyclic esters of phosphoric acid polymerization 231
  — in cyclic siloxanes polymerization 222
  — in cyclic sulfides polymerization 191
  — in lactones polymerization 178
  — in lactams polymerization
  — in oxazolines polymerization 210
  — in tetrahydrofuran polymerization 83
  — in 1,3,5-trioxane polymerization 107

Protonated lactams, polymerization by 202
β-Propiolactone
— copolymerization with 3,3-bis(chloromethyl)oxetane 237
— copolymerization with tetrahydrofuran 256, 257
— cyclic oligomers formation in zwitterionic copolymerization 43
— direction of ring opening 178
— polymerization of 178
— zwitterionic copolymerization of 260, 265

Propylene oxide
— alternating copolymerization with SO₂ 267
— copolymerization
  — with tetrahydrofuran 248
  — with 1,3,5-trioxane 131
— cyclic oligomers formation 60
— polymerization of 54

Radiation polymerization
— of 3,3-bis(chloromethyl)oxetane 69, 74
— of β-propiolactone 177
— of 1,3,5-trioxane 122, 124

Reactivity ratios in copolymerization 236, 239
— correlation with structure 247
— in copolymerization of anhydrosugars
— in copolymerization of oxetanes 245, 246
— in 1,3-dioxolane-1,3,5-trioxane copolymerization 125
— in reversible copolymerization 250, 251
Redistribution in polyacetals 119
Reversibility
— of polymerization 6
— of copolymerization 237, 249
Ring-chain equilibria 3, 38
Ring strain
— in bicyclic monomers 148
— in cyclic monomers 15, 16

Scrambling 79
Sequence distribution
— in 1,3-dioxolane-1,3,5-trioxane copolymers
  — by $^1$H-NMR 125
  — by $^{13}$C-NMR 127
— influence on copolymer properties 127, 129, 130
— in 1,3-dioxolane-1,3-dioxepane copolymers
  by $^{13}$C-NMR 277
Sequential copolymerization
— of 3,3-bis(chloromethyl)oxetane
  — with 1,3-dioxolane 75
  — with tetrahydrofuran 75
— of cyclic acetals 277
Siloxanes (cyclic)
— block copolymers with tetrahydrofuran 275
— cyclic oligomer formation 39, 48, 218
— polymerization of 216
Solid-state polymerization
— of 3,3-bis(chloromethyl)oxetane
  — of lactones 177
  — of 1,3,5-trioxane 101, 122, 124
Solvent effect on polymerization thermodynamics 6
Spandex® 80
Spiroorthoesters
— microstructure of polymers 171
— polymerization of 168
Stereochemistry
— of anhydrosugars polymerization 146
— of 6,8-dioxabicyclo[3.2.1]octane polymerization 155
— of lactams polymerization 203
— of lactones polymerization 180
Styrene
— block copolymers
  — with aziridine 272
  — with oxazolines 272
— copolymerization
  — with 1,3-dioxolane 133, 258
  — with 1,3,5-trioxane 132, 133, 258
Styrene oxide
— cyclic oligomers formation 61
Substituent effect on polymerization thermodynamics 18
Sugar anhydrides — see Anhydrosugars
Sulfur dioxide
— alternating copolymers with propylene oxide 226

Telechelics
— in cyclic siloxanes polymerization 217, 218
— in epichlorohydrin polymerization 53, 63
— in 1,3-dioxolane polymerization 98
— in tetrahydrofuran polymerization 80, 85
— in tetrahydrofuran-oxiranes copolymerizations 88
Telomerization
— of cyclic siloxanes 217, 218
Termination
— in cyclic polymerization 193
— in cyclic sulfides polymerization 193
— in oxetanes polymerization 70
— in 1,3,5-trioxane polymerization 122
Tetrahydrofuran
— alternating copolymers with maleic anhydride 266
— block copolymers
  — with 3,3-bis(chloromethyl)oxetane 275
  — with cyclic amines 276
  — with cyclic siloxanes 275
  — with cyclic sulfides 276
  — with epichlorohydrin 64
  — with ethylene oxide 64
— copolymerization
  — with 3,3-bis(chloromethyl)oxetane 250, 269
  — with cyclic siloxanes 275
  — with 1,3-dioxolane 252
  — with β-propiolactone 256, 287
  — with propylene oxide 88, 248
— cyclic oligomers formation 36, 46, 47, 50, 79
— grafting
  — from epoxides 289
  — from neoprene rubbers 289
— linear oligomers of 11, 83, 85
— macromonomers of 87
— polymerization of 79
— star-shaped polymers of 281, 282
— thermodynamics of polymerization 7, 8, 19, 23
Tetrahydropyrene
— copolymerization
  — with epichlorohydrin 31
  — with oxetanes 31
Tetrahydrodiophene
— thermodynamics of polymerization 6
1,3,6,9-Tetraoxacycloundecane
— cyclic oligomers formation 44
1,3,5,7-Tetraoxocane
— copolymerization with styrene 258
— equilibria with polyoxymethylene chains 112
— equilibrium concentration of 116
— thermodynamics of polymerization 113
Subject Index 317

1,3,6,9-Tetraoxaundecane
— cyclic oligomers formation 44
Thermodynamics of polymerization
— influence of degree of polymerization on 9
— influence of monomer concentration on 8
— influence of phase separation on 11
— influence of solvent on 6
— of copolymerization 27
— of real systems 6, 23
Thietanes
— polymerization of 186
— reactivity ratios in copolymerization 245
Thiranes
— cyclic oligomers formation from 36, 46, 192
— polymerization of 187
Transacetalization
— in 1,3-dioxolane polymerization 119
— in 1,3-dioxolane-1,3,5-trioxane copolymerization 121, 125
Transfer
— chain transfer
— in copolymerization 238
— in cyclic amines polymerization 193
— in cyclic esters of phosphoric acid polymerization 232
— in cyclic sulfides polymerization 193
— in 6,8-dioxabicyclo[3.3.1]octane polymerization 158
— in lactones polymerization 181
— in oxazolines polymerization 212
— in tetrahydrofuran polymerization 86
— in 1,3-trioxane polymerization 117
— in 1,3,5-trioxane-1,3-dioxolane copolymerization 120
Trifluorosulfonic acid as initiator of polymerization
— of bicyclic orthoesters 166
— of cyclic acetics 96, 98
— of cyclic siloxanes 221
— of oxiranes 59
— of tetrahydrofuran 81
Trifluorosulfonic anhydride as initiator of polymerization
— of cyclic acetics 92, 96, 277, 279, 280
— of cyclic amines 188
2,6,7-Trioxabicyclo[2.2.1]heptane
— polymerization of 165
— volume changes upon polymerization 167
2,6,7-Trioxabicyclo[2.2.1]octane
— volume changes upon polymerization 167
1,3,5-Trioxane
— chain transfer in polymerization of 117, 119
— copolymerization of 106, 112, 120, 121, 125, 129, 132
— crystallinity of polymers 111, 123
— crystallization during polymerization 107, 108, 115
— hydride transfer in polymerization of 118, 119
— polymerization of 91, 94, 99
— properties of 100
— radiation polymerization of 124
— solid-state polymerization of 123
— thermal stability of polymers 120
— thermodynamics of polymerization 26, 107, 112, 115
— transacetalization in polymerization of 119, 121
1,4,6-Trioxaspiro[4.4]nonane
— microstructure of polymers 171
— polymerization of 164, 168
1,3,5-Trioxepane
— thermodynamics of polymerization 29
Unstable fraction
— in polyoxymethylene 120
Volume changes in polymerization 163
Water
— as chain transfer agent 117
— as solvent for ethyleneimine polymerization 195
— cocatalysis by
— in oxetanes-AlR₃ system 68
— in oxetanes-BF₃ system 68
— in 1,3,5-trioxane-BF₃ system 105
— in hydrolytic polymerization of lactams 206
— role in cyclic siloxanes polymerization 223
Zwitter-ions
— in “no catalyst” alternating copolymerizations 260
— in 1,3,5-trioxane polymerization 105