

Contents

Acknowledgment *vii*

Introduction *1*

Part I Characteristic Features of CDs *7*

- 1 CD-Based Rotaxanes and Polyrotaxanes as Representative Supramolecules** *9*
 - 1.1 CD-Based Rotaxanes *10*
 - 1.2 CD-Based Polyrotaxanes *19*
 - 1.2.1 CD-Based Polyrotaxanes with Triblock and Pentablock Backbones *19*
 - 1.2.2 CD-Based Polyrotaxanes with other Backbones *26*
 - 1.3 CD-Based Pseudopolyrotaxanes *43*
- 2 CD-Based Micelles, Vesicles, and Metal Nanoparticles** *51*
 - 2.1 CD-Based Micelles *52*
 - 2.2 CD-Based Vesicles *68*
 - 2.3 CD-Based Metal Nanoparticles *75*
- 3 CD Inclusion Complexes** *87*
 - 3.1 CD Inclusion Complexes with Monocarboxylic Aromatic Acids *87*
 - 3.2 The β - and γ -CD Inclusion Complexes with Selected Guest Components *88*
- 4 CD Dimers** *99*
 - 4.1 CD Dimers Bridged by Various Spacers *99*
 - 4.2 CD Dimers Bridged by Azobenzene Moiety and by Platinum (IV) Complex as Spacers *119*

References *129*

Part II Polymeric CDs 145

5 CD Multiarm Polymers 147

- 5.1 Multiarm Polymers Containing a CD Core 147
- 5.2 Micelles and Multiarm CD Polymers Containing a POSS Core 159

6 CD-Based Dendrimers 167

- 6.1 Monomeric Dendrimers with a CD Core 167
- 6.2 Polymeric CD-Based Dendrimers 171
 - 6.2.1 Polymeric Dendrimers with a PAMAM Core 171
 - 6.2.2 Polymeric Dendrimers with a CD Core 180

7 CD-Based Polymeric Gels 187

- 7.1 Polymeric Gels Built Exclusively from CD 187
- 7.2 Polymeric Gels Built from CD and selected Polymers 190
- 7.3 CD-Based Polymeric Gels as Nanosponges 199
- 7.4 CD-Based Gels Built with the use of ILs 209

References 219

Part III CD Assemblies with Nanocarbons and Final Remarks Concerning CD Applications 229

8 CD Assemblies with Nanocarbons 231

- 8.1 CD Assemblies with Fullerenes 232
 - 8.1.1 CD Covalent Assemblies with Fullerenes 232
 - 8.1.2 CD Noncovalent Assemblies with Fullerenes 235
- 8.2 CD Assemblies with Nanotubes 248
- 8.3 CD Assemblies with Graphene 259

9 CD Applications 269

- 9.1 CD Medical Applications 270
- 9.2 CD Environmental Protection Applications 276
- 9.3 CD Industrial Applications 286

References 297

Conclusion 309

Index 311