

Contents

| | |
|--|------------|
| Preface | ix |
| About the authors | xi |
| 1 Introduction | 1 |
| 1.1 What is supramolecular chemistry? | 1 |
| 1.2 Selectivity | 4 |
| 1.3 Supramolecular interactions | 17 |
| 1.4 Supramolecular design | 26 |
| References | 27 |
| Suggested further reading | 27 |
| 2 Solution host–guest chemistry | 29 |
| 2.1 Introduction: guests in solution | 29 |
| 2.2 Macrocyclic versus acyclic hosts | 30 |
| 2.3 Cation binding | 36 |
| 2.4 Anion binding | 52 |
| 2.5 Metal-containing receptors | 66 |
| 2.6 Simultaneous cation and anion receptors | 73 |
| 2.7 Neutral-molecule binding | 82 |
| 2.8 Supramolecular catalysis and enzyme mimics | 97 |
| References | 104 |
| 3 Self-assembly | 107 |
| 3.1 Introduction | 107 |
| 3.2 Biological self-assembly | 114 |
| 3.3 Ladders, polygons and helices | 121 |
| 3.4 Rotaxanes, catenanes and knots | 133 |
| 3.5 Self-assembling capsules | 156 |
| References | 167 |
| 4 Solid state supramolecular chemistry | 171 |
| 4.1 Introduction | 171 |
| 4.2 Zeolites | 172 |
| 4.3 Clathrates | 179 |
| 4.4 Clathrate hydrates | 187 |

| | | |
|----------|--------------------------------------|------------|
| 4.5 | Crystal engineering | 194 |
| 4.6 | Coordination polymers | 209 |
| | References | 225 |
| 5 | Nanochemistry | 229 |
| 5.1 | Introduction | 229 |
| 5.2 | Nanomanipulation | 233 |
| 5.3 | Molecular devices | 237 |
| 5.4 | Self-assembled monolayers (SAMs) | 254 |
| 5.5 | Soft lithography | 264 |
| 5.6 | Nanoparticles | 266 |
| 5.7 | Fullerenes and nanotubes | 272 |
| 5.8 | Dendrimers | 277 |
| 5.9 | Fibres, gels and polymers | 279 |
| 5.10 | Nanobiology and biomimetic chemistry | 284 |
| | References | 293 |
| | Index | 297 |