

CONTENTS

Acknowledgements	ix
General Preface	xi
<i>John K. Gilbert, Onno De Jong, Rosária Justi, David F. Treagust, Jan H. Van Driel</i>	
Foreword	xv
<i>Dorothy Gabel</i>	
Section A: Chemistry and Chemical Education	1
Preface to Section A	3
<i>John K. Gilbert</i>	
1. The Nature of Chemical Knowledge and Chemical Education	7
<i>Sibel Erduran, Eric Scerri</i>	
2. The History of Chemistry: Potential and Actual Contributions to Chemical Education	29
<i>James H. Wandersee, Phyllis Baudoin Griffard</i>	
3. Models and Modelling in Chemical Education	47
<i>Rosária Justi, John K. Gilbert</i>	
4. Learning Chemistry in a Laboratory Environment	69
<i>Mary B. Nakhleh, John Polles, Eric Malina</i>	
Section B: The Curriculum for Chemical Education	95
Preface to Section B	97
5. Chemistry Curricula for General Education: Analysis and Elements of a Design	101
<i>Wobbe de Vos, Astrid M. W. Bulte, Albert Pilot</i>	

6.	The Roles of Chemistry in Vocational Education	125
	<i>Deborah Corrigan, Peter Fensham</i>	
7.	Informal Chemical Education	143
	<i>Susan Stocklmayer, John K. Gilbert</i>	
8.	Context-based Approaches to the Teaching of Chemistry: What are they and What are their Effects?	165
	<i>Judith Bennett, John Holman</i>	
	Section C: Teaching and Learning about Chemical Compounds	185
	Preface to Section C	187
	<i>David F. Treagust</i>	
9.	The Particulate Nature of Matter: Challenges in Understanding the Submicroscopic World	189
	<i>Allan G. Harrison, David F. Treagust</i>	
10.	Bonding	213
	<i>Keith S. Taber, Richard K. Coll</i>	
11.	Problem-Solving in Chemistry	235
	<i>George M. Bodner, J. Dudley Herron</i>	
	Section D: Teaching and Learning about Chemical Change	267
	Preface to Section D	269
	<i>Rosária Justi</i>	
12.	The Teaching and Learning of Chemical Equilibrium	271
	<i>Jan H. Van Driel, Wolfgang Gräber</i>	
13.	Teaching and Learning Chemical Kinetics	293
	<i>Rosária Justi</i>	
14.	The Teaching and Learning of Electrochemistry	317
	<i>Onno De Jong, David F. Treagust</i>	

15.	From Chemical Energetics to Chemical Thermodynamics	339
	<i>Martin J. Goedhart, Wolter Kaper</i>	
	Section E: Developing Teachers and Chemical Education	363
	Preface to Section E	365
	<i>Onno De Jong</i>	
16.	Exploring Chemistry Teachers' Knowledge Base	369
	<i>Onno De Jong, William R. Veal, Jan H. Van Driel</i>	
17.	Research and Development for the Future of Chemical Education	391
	<i>John K. Gilbert, Onno De Jong, Rosária Justi, David F. Treagust, Jan H. Van Driel</i>	
	Notes about the Contributors	409
	Index	419