

# CONTENTS

List of Tables ix

List of Figures xiii

Foreword xv

Preface xvii

Task Group on Chemical Thermodynamic Tables xix

## 1. INTRODUCTION 1

- 1.1 The CODATA Task Group on Chemical Thermodynamic Tables 1
- 1.2 The Preparation of Thermodynamic Tables 2
- 1.3 The Prototype Tables 2

## 2. CONVENTIONS, STRUCTURES AND CONTENTS OF THE TABLES 6

- 2.1 General 6
- 2.2 Nomenclature and Symbols 6
- 2.3 Units and Scales 6
- 2.4 Fundamental Constants and Related Values 7
- 2.5 Molar Masses 8
- 2.6 State of Aggregation 8
- 2.7 Standard and Reference States, Reference Temperatures 8
  - 2.7.1 Pure Substances and Mixtures of Constant Composition 9
  - 2.7.2 Systems of Variable Composition (Mixtures) 9
    - 2.7.2.1 Mixtures with all Components Treated Alike 10
    - 2.7.2.2 Mixtures in which One Component Predominates 11
  - 2.7.3 Reference Temperatures 13
  - 2.7.4 Reference States 13
- 2.8 Reliability 14
  - 2.8.1 Limitations on the Expression of Reference Data 14
  - 2.8.2 Conventions Used in Reporting Recommended Values 16
- 2.9 Thermal Function 17
- 2.10 Thermochemical Properties at 298.15 K 20
- 2.11 Systems of Variable Composition 21
  - 2.11.1 General 21
  - 2.11.2 The System Ca-Mg 22
  - 2.11.3 The System CaCl<sub>2</sub>-KCl 23
  - 2.11.4 The System CaCl<sub>2</sub>-H<sub>2</sub>O 23
- 2.12 Reaction Catalogs 24
  - 2.12.1 Thermochemical Catalog and Data Networks 24
  - 2.12.2 Other Catalogs 25

2.13	Bibliography	26
2.14	Credits and Acknowledgements	26

### 3. THE FUTURE 28

3.1	The Current Status and Immediate Plans	28
3.2	Cooperative Activities	28
3.3	Quality Control and Continuity	29
3.4	Updating and Expanding the Tables	29
3.5	Summary	30

### 4. REFERENCES IN CHAPTERS 1 TO 3 31

### 5. GLOSSARY OF SYMBOLS 33

5.1	Symbols	33
5.2	Definitions Used for Properties of Mixtures	38
5.2.1	For Mixtures in which One Substance Predominates	38
5.2.2	Generally Applicable Definitions	39

### 6. TABLES OF CHEMICAL THERMODYNAMIC DATA 40

6.1	Thermodynamic Properties of Individual Substances	40
6.1.1	Properties as a Function of Temperature	41
6.1.2	Discussion	41
6.1.3	Equations for the Functions	42
	<i>Tables: Compounds of Magnesium, Calcium, and Potassium</i>	
	<i>Auxiliary Substances</i>	44
6.2	Thermochemical Properties at 0 and 298.15 K	178
6.2.1	Table of Values of Formation Properties	179
6.2.2	Discussion	179
6.2.2.1	General	179
6.2.2.2	Conventions for Formation Properties	185
6.2.2.3	Uncertainties for Substances and Processes	185
6.2.2.4	Major Aspects of the Evaluation	188
6.2.2.5	Remarks on Individual Substances	189
6.2.3	Network Diagram	193
	<i>Tables: Compounds of Magnesium, Calcium and Potassium</i>	
6.3	The Alloy System Ca-Mg	194
6.3.1	Introduction	195
	<i>Phase Diagram</i>	195
	<i>Table of Mixing Properties</i>	196
6.3.2	Gibbs Energies of Mixing, Liquid and hcp Phases	197
6.3.3	Thermochemistry of CaMg <sub>2</sub> (hcp)	197
6.3.4	Gibbs Energies of Transformation of the Components	198
6.3.5	Discussion	199

6.4	The Fused Salt System $\text{CaCl}_2\text{-KCl}$	202
6.4.1	Introduction	203
	<i>Phase Diagram</i>	203
	<i>Table of Mixing Properties</i>	204
6.4.2	Gibbs Energies of Mixing, Liquid Phase	205
6.4.3	Thermochemistry of $\text{KCaCl}_3(\text{cr})$	205
6.4.4	Gibbs Energies of Transformation of the Components	206
6.4.5	Discussion	207
6.5	System $\text{CaCl}_2\text{-H}_2\text{O}$	210
6.5.1	Introduction	211
	<i>Phase Diagram</i>	211
	<i>Tables of Excess Properties</i>	213
6.5.2	Correlating Equations	228
6.5.3	Discussion	230
<b>7.</b>	<b>CATALOGS OF MEASUREMENTS USED IN THE EVALUATIONS</b>	<b>238</b>
7.1	Thermochemical Reaction Catalog	239
7.1.1	Values for Properties of Substances	239
	<i>Table: Thermochemical Properties of Substances and Index to the Measurements</i>	241
7.1.2	The Catalog of Reactions	249
7.1.3	Interpreting the Catalog	250
	<i>Table: Catalog of Measurements</i>	251
7.2	Ca-Mg Reaction Catalog	305
7.3	$\text{CaCl}_2\text{-H}_2\text{O}$ Reaction Catalogs	312
<b>8.</b>	<b>BIBLIOGRAPHY</b>	<b>328</b>