

# CONTENTS

CONTRIBUTORS	v
FOREWORD	vii
CONTENTS OF VOLUME 2 .. .. .	x
<b>A. SOLID ELECTROLYTES AND ELECTRODES</b>	
<b>1. The Solid State J. HLADIK</b>	
I. Classification of solids .. .. .	5
II. The band theory .. .. .	15
III. The tight-binding approximation .. .. .	33
References .. .. .	33
<b>2. The Solid Electrolyte J. HLADIK</b>	
I. Classification of solid electrolytes .. .. .	35
II. Crystalline electrolytes .. .. .	39
III. Imperfect crystalline electrolytes .. .. .	46
IV. Amorphous electrolytes .. .. .	51
V. Interatomic distances .. .. .	57
VI. Electronic energy bands .. .. .	62
VII. Cohesive energy of ionic crystals .. .. .	66
References .. .. .	76
<b>3. Theory of Crystalline Solid Electrolyte Solutions F. K. FONG</b>	
I. Introduction .. .. .	79
II. Statistical mechanics of crystalline electrolytes .. .. .	82
III. Experimental characterization of ion-defect pair formation .. .. .	106
IV. Intermediate temperature region .. .. .	114
V. Reactions in crystalline lattices .. .. .	118
Acknowledgements .. .. .	124
References .. .. .	124
<b>4. Nuclear Microanalysis G. AMSEL</b>	
I. Method .. .. .	128
II. Elemental analysis .. .. .	132
III. O <sup>18</sup> tracing .. .. .	141
IV. Conclusion .. .. .	148
References .. .. .	149

**B. TRANSPORT PROCESSES**

<b>5. Basic Theory of Ionic Transport Processes R. J. FRIAUF</b>	
I. Introduction .. .. .	153
II. Properties of defects .. .. .	158
III. Ionic conductivity .. .. .	169
IV. Long range interactions .. .. .	178
V. Diffusion .. .. .	183
VI. Conclusion .. .. .	197
References .. .. .	201
<b>6. Diffusion in Ionic Crystals F. BÉNIÈRE</b>	
I. Introduction .. .. .	204
II. Fick's first law .. .. .	206
III. The main laws of diffusion of practical interest .. .. .	211
IV. Defects in ionic crystals .. .. .	220
V. Expressions for the diffusion coefficients .. .. .	229
VI. Correlation factors .. .. .	249
VII. The measurement of the diffusion coefficients .. .. .	256
VIII. Numerical results .. .. .	258
IX. Comparison with theory .. .. .	285
X. Conclusion .. .. .	290
Acknowledgements .. .. .	291
References .. .. .	291
Table of diffusion constants in alkali halide and silver halide single crystals .. .. .	295
<b>7. Transference Numbers in Ionic Crystals F. BÉNIÈRE</b>	
I. Introduction .. .. .	299
II. Faraday's law .. .. .	301
III. The measurement of transference numbers .. .. .	302
IV. Possible determination of the transference numbers from self-diffusion coefficient measurements .. .. .	313
V. Possible determination of the diffusion coefficients via neutral defects from transference number measurements .. .. .	316
References .. .. .	317
<b>8. Electrical Conductivity A. KVIST</b>	
I. Introduction .. .. .	319
II. Experimental .. .. .	320
III. Measurements in oxide systems .. .. .	323
IV. Measurements in ion conducting salts .. .. .	341
V. Measurements in other systems .. .. .	343
References .. .. .	344

<b>9. The Ionic Conductivity of Whiskers</b>	<b>E. HARTMANN</b>	<b>347</b>
References .. .. .		<b>350</b>
<b>10. Ionic Transport in Glasses</b>	<b>K. HUGHES and J. O. ISARD</b>	
I. Introduction .. .. .		<b>351</b>
II. Structure of glass .. .. .		<b>352</b>
III. Theory of ionic transport in glass .. .. .		<b>356</b>
IV. Measurement of transport numbers .. .. .		<b>361</b>
✓ V. Electrode polarization effects .. .. .		<b>364</b>
IV. Dependence of cationic conductivity on composition .. .. .		<b>367</b>
VII. Methods of investigating conduction due to other than alkali ions .. .. .		<b>388</b>
References .. .. .		<b>396</b>
<b>11. Transport Phenomena in Ion-Exchange Membranes</b>	<b>E. RIANDE</b>	
I. Introduction .. .. .		<b>401</b>
II. Preparation of ion-exchange membranes .. .. .		<b>403</b>
III. Transport phenomena in membranes .. .. .		<b>416</b>
IV. Applications of ion-exchange membranes .. .. .		<b>504</b>
References .. .. .		<b>509</b>
<b>AUTHOR INDEX</b>		<b>xv</b>
<b>SUBJECT INDEX</b>		<b>li</b>
<b>COMPOUND INDEX</b>		<b>lix</b>