



## *Contents*

*Contributors* ix

*Preface* xi

*Contents of Volume 2* xiii

### *1. Elastic Scattering of Electrons by Molecules*

G. Csanak, D. C. Cartwright, S. K. Srivastava, and S. Trajmar

I. Introduction	2
II. Experimental Techniques	5
III. Theoretical Methods	41
IV. Comparison of Experimental and Theoretical Results	89
V. Applications	119
References	142

### *2. Excitation of Molecules by Electron Impact*

S. Trajmar and D. C. Cartwright

I. Introduction	156
II. Definition of Electron Collision Cross Sections	158
III. Electron-Impact Spectroscopy	160
IV. Experimental Techniques for Measuring Electron-Impact Excitation Cross Sections	166
V. Electron-Impact Excitation Cross Section Data	171
VI. Generation of Optical Data by Electron-Impact Techniques	181
VII. Recent Developments	190
VIII. Theory of Electron-Molecule Collisions	193
IX. Comparison of Theory and Experiment	202
X. Applications of Electron Collision Data	226
References	242

*3. Ionization of Molecules by Electron Impact*

T. D. Märk

I. Introduction	251
II. Ionization Mechanisms and Types of Ions Produced	252
III. Total and Partial Ionization Cross Sections	279
IV. Differential Ionization Cross Sections	306
References	315

*4. Dissociation of Molecules by Electron Impact*

E. C. Zipf

I. Introduction	335
II. Models	338
III. Experimental Techniques	346
IV. Measurements	363
References	397

*5. Electron-Molecule Resonances*

J. B. Hasted and D. Mathur

I. Introduction	403
II. Theory of Resonances	405
III. Experimental Techniques for the Study of Resonances	424
IV. Experimental Results	432
V. Conclusions	471
References	471

*6. Electron Attachment Processes*

L. G. Christophorou, D. L. McCorkle, and A. A. Christodoulides

I. Introduction	478
II. Modes of Production of Negative Ions	479
III. Techniques for the Study of Electron Attachment Processes	495
IV. Dissociative Electron Attachment to Ground-State Molecules	504
V. Dissociative Electron Attachment to "Hot" Molecules (Effects of Temperature on Dissociative Electron Attachment)	558
VI. Dissociative Electron Attachment to Electronically Excited Molecules	568
VII. Molecular Parent Negative Ions	569

VIII.	Negative Ions Formed by Ion Pair Processes and by Collisions of Molecules with Ground-State and Rydberg Atoms	593
IX.	Doubly Charged Negative Ions	605
	References	606
7.	<i>Electron Detachment Processes</i>	
R. L. Champion and L. D. Doverspike		
I.	Introduction	619
II.	Nomenclature and Experimental Techniques	621
III.	Atomic Reactants	623
IV.	Molecular Targets	639
V.	Detachment Accompanied by Rearrangement	656
VI.	Molecular Negative Ions	673
VII.	Detachment Rate Constants	677
VIII.	Summary	678
	References	679
<i>Index</i>		683