

Contents

LIST OF CONTRIBUTORS	v
FOREWORD	vii
CONTENTS OF VOLUME 1	xi

The Calculation of Van der Waals Interactions

A. Dalgarno and W. D. Davison

I. Introduction	1
II. The Theory of Long-Range Forces	2
III. The Calculation of Long-Range Forces	6
IV. Approximate Formulas	17
V. Three-Body Forces	20
VI. Summary of Values and Comparison with Experiment	23
References	29

Thermal Diffusion in Gases

E. A. Mason, R. J. Munn, and Francis J. Smith

I. Introduction	33
II. Experimental Methods	35
III. Molecular Theory of Thermal Diffusion	54
IV. Results	74
References	86

Spectroscopy in the Vacuum Ultraviolet

W. R. S. Garton

I. Introduction	93
II. Instrumentation and Techniques	95
III. Atomic Spectra	121
IV. Molecular Spectra	141
V. Atomic Collisions	147
VI. Spectra from Laboratory and Astrophysical Plasmas	160
Appendix	165
References	168

The Measurement of the Photoionization Cross Sections of the Atomic Gases

James A. R. Samson

I. Introduction	178
II. The Rare Gases	180
III. Atomic Oxygen, Nitrogen, and Hydrogen	225

IV. The Alkali Metals	240
V. Miscellaneous Atoms	253
References	257

The Theory of Electron-Atom Collisions

R. Peterkop and V. Veldre

I. General Problems	264
II. Close-Coupling Methods	271
III. Other Methods	295
IV. Effective Range Theory	312
References	321

Experimental Studies of Excitation in Collisions between Atomic and Ionic Systems

F. J. de Heer

I. Introduction	328
II. Processes Leading to Excitation	328
III. Cross Sections	329
IV. Experimental Procedures	331
V. Emission and Polarization of Light as a Function of Gas Pressure and Ion Beam Current	344
VI. Excitation Cross Sections	346
VII. Electron Capture Cross Sections	364
VIII. Combined Excitation and Capture Cross Sections	372
IX. Investigations of Astrophysical Interest	381
References	381

Mass Spectrometry of Free Radicals

S. N. Foner

I. Introduction	385
II. General Principles	387
III. Ionization and Appearance Potentials by Electron Impact	400
IV. Free-Radical Gas Sampling Systems	412
V. Modulated Molecular Beam Mass Spectrometry	417
VI. Applications	426
VII. Summary	456
References	458

AUTHOR INDEX

463

SUBJECT INDEX

477