



Volume 39 **Nonequilibrium Vibrational Kinetics**

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Nonequilibrium Vibrational Kinetics

Edited by M. Capitelli

With 120 Figures

Springer-Verlag Berlin Heidelberg New York
London Paris Tokyo

Professor Mario Capitelli

Centro di Studio per la Chimica dei Plasmi del C.N.R.
Dipartimento di Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

ISBN-13: 978-3-642-48617-3
DOI: 10.1007/978-3-642-48615-9

e-ISBN-13: 978-3-642-48615-9

Library of Congress Cataloging-in-Publication Data. Nonequilibrium vibrational kinetics. (Topics in current physics ; 39) 1. Chemical reaction, Rate of. 2. Molecular dynamics. I. Capitelli, M. II. Series. QD502.N65 1986 539'.6 86-3788

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Softcover reprint of the hardcover 1st edition 1986

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2153/3150-543210

Preface

This book is devoted to the systematic treatment of nonequilibrium vibrational kinetics in molecular systems. Particular emphasis is given to the vibrational excitation of diatomic molecules by low-energy electrons in a discharge and by IR photons in laser-pumped systems.

The book follows the different steps of the introduction, redistribution, loss, and chemical conversion of the vibrational quanta, from the points of view of the overall kinetics and the dynamics of elementary processes. These two aspects are balanced in a multidisciplinary approach. The different chapters give the basic instruments (theoretical and experimental) which are needed to understand the kinetics of nonequilibrium systems.

The book will introduce the reader to different areas such as plasmachemistry, laser chemistry, IR and Raman spectroscopy, and relaxation phenomena, emphasizing how the vibrational energy affects such research fields. The chapters dedicated to collisional dynamics involving vibrational excited molecules provide an introduction to the modern techniques utilized in the scattering theory of inelastic and reactive collisions. The extension of the vibrational kinetics to polyatomic molecules, discussed in Chap. 10, is the natural bridge between collision and collisionless regimes.

In conclusion, we hope that the approach followed in this book will stimulate the collaboration of researchers coming from different research fields, which are too often completely separate.

Bari, April 1986

Mario Capitelli

Contents

1. Introduction. By M. Capitelli	1
1.1 Nonequilibrium Versus Equilibrium Vibrational Kinetics	1
1.2 Organization of This Book	2
2. Vibrational Kinetics, Dissociation, and Ionization of Diatomic Molecules Under Nonequilibrium Conditions. By M. Cacciatore, M. Capitelli, S. De Benedictis, M. Dilonardo, and C. Gorse (With 34 Figures)	5
2.1 Laser-Induced Vibrational Kinetics	6
2.1.1 General Characteristics	6
2.1.2 Case Studies: Heteronuclear Diatomic Molecules	8
2.1.3 Homonuclear Diatomic Species	18
2.2 Nonequilibrium Vibrational Kinetics Under Electrical Discharges	20
2.2.1 General Considerations	20
2.2.2 Case Studies	22
a) Nitrogen	22
b) Hydrogen	29
c) Carbon Monoxide	33
2.3 Post-Discharge Conditions	40
2.4 Summary	44
References	45
3. Analytical Theory of Vibrational Kinetics of Anharmonic Oscillators By B.F. Gordiets and S. Zhdanok (With 2 Figures)	47
3.1 Historical Overview	47
3.2 Rate Equations and Probabilities of Elementary Processes	48
3.3 V-T Relaxation in an Inert Gas	51
3.4 Treanor Distribution in the V-V Exchange	52
3.5 V-V and V-T Exchange. Weak Excitation Regime	54
3.6 Resonance V-V Relaxation Under High-Excitation Conditions. Steady-State Conditions	56
3.7 Relaxation at Moderate Excitation of Vibrations	62
3.8 Non-Steady-State Relaxation Regime at High Excitation	63

3.9	Vibrational Kinetics and Chemical Reactions Involving Vibrationally Excited Molecules	65
3.10	Laser Emission Excitation of Molecular Vibrations	70
3.11	Vibrational Relaxation Under Adiabatic Expansion in the Supersonic Nozzle	75
3.12	Further Studies and Outlook	81
	References	82
4.	Vibration-Vibration and Vibration-Translation Energy Transfer, Including Multiquantum Transitions in Atom-Diatom and Diatom-Diatom Collisions. By G.D. Billing	85
4.1	First-Order Theories	86
4.2	Scaling Theories	91
4.3	Semiclassical Theories	94
4.4	Analytical Expressions for V-V and V-T Rate Constants	97
4.5	Energy Transfer in Specific Systems	98
4.5.1	V-T Processes in the He + CO and CO + CO Systems	98
4.5.2	V-V Processes in CO + CO and CO + N ₂	100
4.A	Appendix: Tables of Energy Transfer Rates in the H ₂ + H ₂ , N ₂ + N ₂ , He + CO, and CO + CO Systems	103
	References	111
5.	Vibrational Energy Transfer in Collisions Involving Free Radicals By I.W.M. Smith (With 6 Figures)	113
5.1	Mechanisms for Vibrational Relaxation	116
5.1.1	Collisions Between Species with Closed Electronic Shells	116
5.1.2	Electronically Nonadiabatic Mechanisms for Vibrational Relaxation	121
5.1.3	Vibrational Relaxation as the Result of Chemical Interaction	124
5.1.4	Summary of Vibrational Relaxation Mechanisms	133
5.2	Experimental Results and Discussion	134
5.2.1	Collisions Between Free Radicals and Noble Gas Atoms	134
5.2.2	Collisions Between Saturated Molecules in Singlet States and Radical Atoms	136
	a) The H ₃ System	137
	b) The H + HX (X = F, Cl) Systems	139
	c) The X, Y + HX (X = F, Cl, Br; Y = Cl, Br, O) Systems	141
5.2.3	Collisions Between Unsaturated Molecules in Singlet States and Radical Atoms	147
5.2.4	Collisions Between Molecules and Molecular Free Radicals	149

5.2.5	Collisions Between Free Radicals	150
5.3	Conclusion and Prognosis	153
	References	154
6.	Dynamics of Reactions Involving Vibrationally Excited Molecules	
	By V. Aquilanti and A. Laganà (With 8 Figures)	159
6.1	Experimental and Computational Results for Representative	
	Atom-Diatom Reactions	160
6.1.1	Reactions of Atoms with Hydrogen Molecules and	
	Isotopic Variants	161
	a) The Reaction $H + H_2$	161
	b) The Reaction $F + H_2$	164
	c) Reactions of Other Atoms with H_2	165
6.1.2	Reactions of Atoms with Hydrogen Halides	166
6.1.3	Reactions of Atoms with Halogen and Interhalogen Molecules ..	169
6.1.4	Reactions of Atoms with Oxygen Molecules	171
6.1.5	Reactions Involving Other Diatomic Molecules and Ions	171
6.2	Theoretical Outlook	173
6.2.1	Coordinates for Rearrangement Processes	173
6.2.2	Decoupling Schemes for Rotations: Sudden Approximations	175
6.2.3	Hyperspherical Adiabatic Approach: Kinematic Effects for	
	Vibrational Energy Exchange	177
6.3	Conclusions	182
	References	182
7.	Vibrational Excitation and Dissociative Attachment	
	By J.M. Wadehra (With 14 Figures)	191
7.1	The Resonance Model	192
7.1.1	Qualitative Remarks	192
7.1.2	Quantitative Discussion	195
7.1.3	Cross Section for Dissociative Attachment	199
7.1.4	Cross Section for Vibrational Excitation	200
7.1.5	Semiclassical Approximation	202
7.2	Applications to Specific Molecules	203
7.2.1	Molecular Hydrogen	204
	a) Resonances	204
	b) Vibrational Excitation	207
	c) Dissociative Attachment	209
	d) Isotope Effect	212

7.2.2	Molecular Nitrogen	212
	a) Resonances	212
	b) Vibrational Excitation	215
	c) "Dissociative Attachment"	217
7.2.3	Carbon Monoxide	218
	a) Resonances	218
	b) Vibrational Excitation	219
	c) Dissociative Attachment	220
7.2.4	Hydrogen Chloride	222
	a) Resonances	222
	b) Vibrational Excitation	223
	c) Dissociative Attachment	225
7.3	Applications of the Attachment Process Under Nonequilibrium Conditions	226
7.3.1	Neutral Beam Injection in Fusion Plasma	227
7.3.2	Electron-Beam Switches	227
7.3.3	Laser Plasma Instabilities	228
7.3.4	Gaseous Dielectrics	228
7.A	Appendix: Normalization of Continuum Functions	228
	References	230

8.	Vibrational Distribution and Rate Constants for Vibrational Energy Transfer. By Ph. Bréchnac and J.-P.E. Taran (With 30 Figures) .	233
8.1	Vibrational Distribution	233
8.1.1	The Vibrationally Excited Medium	234
8.1.2	Infrared Techniques	235
	a) Infrared Spontaneous Emission	235
	b) Probe Laser Technique	236
	c) Typical Results	239
	d) Conclusion	244
8.1.3	Light-Scattering Techniques	245
	a) Spontaneous Raman Scattering-Fluorescence	245
	b) Coherent Anti-Stokes Raman Scattering	249
	c) Summary	258
8.1.4	Other Techniques	259
	a) Multiphoton Ionization	259
	b) Velocity-Modulated Infrared Laser Spectroscopy	259

8.2	Rate Constants for Vibrational Energy Transfer	259
8.2.1	Steady-State Measurements	260
8.2.2	Time-Resolved Measurements	261
	a) Laser-Induced Infrared Fluorescence	261
	b) Two-Laser Experiments	264
	c) Other Time-Resolved Techniques	266
	References	266
9.	Isotope Separation by Vibration-Vibration Pumping	
	By J.W. Rich and R.C. Bergman (With 11 Figures)	271
9.1	Kinetic Modeling	272
9.2	Experimental Studies	277
9.2.1	Carbon Monoxide	277
	a) Optical Excitation	278
	b) Glow Discharge Excitation	283
9.2.2	Nitrogen/Oxygen Mixtures	286
9.3	V-V Pumping as an Alternative Method of Stable Isotope Preparation .	288
	References	292
10.	Vibrational Kinetics and Reactions of Polyatomic Molecules in	
	Nonequilibrium Systems. By V.D. Rusanov, A.A. Fridman, and G.V. Sholin .	295
10.1	Elementary Process of V-T Relaxation of Highly Excited	
	Polyatomic Molecules	296
10.2	Elementary Process of V-V Exchange of Highly Excited	
	Polyatomic Molecules	299
10.3	Population of Vibrationally Excited States of Polyatomic Molecules	
	in Nonequilibrium Conditions	301
10.4	Reactions of Polyatomic Molecules Under Essentially	
	Nonequilibrium Conditions	305
	10.4.1 Fast Reactions	307
	10.4.2 Slow Reactions	307
10.5	CO ₂ Dissociation Stimulated by Vibrational Excitation of	
	Molecules in Plasma	308
	10.5.1 Single-Temperature Approximation	310
	10.5.2 Two-Temperature Approximation	310
10.6	Summary	312
	References	312

11. Coupling of Vibrational and Electronic Energy Distributions in Discharge and Post-Discharge Conditions	
By M. Capitelli, C. Gorse, and A. Ricard (With 15 Figures)	315
11.1 Coupling Between N_V and the Free-Electron Energy Distribution Function	316
11.1.1 Electrical Discharges	316
11.1.2 Post-Discharge Conditions	324
11.2 Coupling Between N_V and N_V^*	330
11.3 Conclusions	335
References	336
Additional References with Titles	339
Subject Index	341

List of Contributors

Aquilanti, Vincenzo

Dipartimento di Chimica, Università, Via Elce di Sotto
I-06100 Perugia, Italy

Bergman, Richard C.

Physical Sciences Department, Calspan Advanced Technology Center
P.O. Box 400, Buffalo, NY 14225, USA

Billing, Gert D.

Department of Chemistry, Panum Institute, University of Copenhagen
DK-2200 Copenhagen

Bréchnignac, Philippe

Laboratoire de Photophysique Moléculaire, CNRS - Université de Paris-Sud
F-91405 Orsay Cedex, France

Cacciatore, Mario

Centro di Studio per la Chimica dei Plasmi del C.N.R., Dipartimento di
Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

Capitelli, Mario

Centro di Studio per la Chimica dei Plasmi del C.N.R., Dipartimento di
Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

De Benedictis, Santolo

Centro di Studio per la Chimica dei Plasmi del C.N.R., Dipartimento di
Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

Dilonardo, Massimo

Centro di Studio per la Chimica dei Plasmi del C.N.R., Dipartimento di
Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

Fridman, Aleksandre A.

I.V. Kurchatov Institute of Atomic Energy, SU-123182 Moscow, USSR

Gordiets, Boris F.

P.N. Lebedev Institute of Physics, Academy of Sciences
Leninskii Prospect 53, SU-117924 Moscow, USSR

Gorse, Claudine

Centro di Studio per la Chimica dei Plasmi del C.N.R., Dipartimento di
Chimica, Università di Bari, Via G. Amendola 173
I-70126 Bari, Italy

Laganà, Antonio

Dipartimento di Chimica, Università di Perugia, Via Elce di Sotto
I-06100 Perugia, Italy

Ricard, André

Laboratoire de Physique des Gaz et des Plasmas, Université de Paris-Sud
F-91405 Orsay Cedex, France

Rich, J. William

Physical Sciences Department, Calspan Advanced Technology Center
P.O. Box 400, Buffalo, NY 14225, USA

Rusanov, Vladimir D.

I.V. Kurchatov Institute of Atomic Energy, SU-123182 Moscow, USSR

Sholin, Guennady V.

I.V. Kurchatov Institute of Atomic Energy, SU-123182 Moscow, USSR

Smith, Ian W.M.

Chemistry Department, The University of Birmingham, P.O. Box 363
Birmingham, B15 2TT, England

Taran, Jean-Pierre E.

Office National d'Etudes et de Recherches Aérospatiales, BP 72
F-92322 Chatillon Cedex, France

Wadehra, Jogindra M.

Department of Physics and Astronomy, Wayne State University
Detroit, MI 48202, USA

Zhdanok, Serguei

Heat and Mass Transfer Institute, USSR Academy of Sciences, P. Brovka Str. 15
SU-220728 Minsk, USSR