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A Supplementary Bibliography of Kinetic Data on Gas Phase Reactions of Nitrogen, Oxygen, and Nitrogen Oxides

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David R. Lide, Jr., Chief
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A SUPPLEMENTARY BIBLIOGRAPHY OF KINETIC DATA
ON GAS PHASE REACTIONS OF NITROGEN,
OXYGEN, AND NITROGEN OXIDES *

FRANCIS WESTLEY

A bibliography, a reaction oriented list of references supplementing NBS publication C6M-71-00841 (NBS-6SRDB-71-2, August 1971), is provided for published papers and reports containing rate data for reactions of N, N₂, N₃,

N₂O, N₂O₂, N₂O₃, N₂O₄, N₂O₅, NO, NO₂, NO₃, NO₄, O, O₂ and O₃ with each other. It includes an extensive list of papers dealing with production and reactions of molecular oxygen in excited singlet states ($a^1\Delta_g$, $b^1\Sigma_g^+$, $c^1\Sigma_u$). In addition, two lists of critical reviews dealing with the above reactions are included. About 500 papers are listed. The period covered extends from 1900 through January 1972.

Key words: Bibliography; chemical kinetics; excited state; gas phase; nitrogen atom; nitrogen molecule; nitrogen oxides; oxygen atom; oxygen molecule; ozone.

INTRODUCTION

Less than one year ago - August 1971 - the Office of Standard Reference Data published a bibliography with the same title as the present one: "A Bibliography of Kinetic Data on Gas Phase Reactions of Nitrogen, Oxygen and Nitrogen Oxides", (C6M-71-00841, NBS-6SRDB-71-2). The period covered by this previous bibliography extended from 1900 through January 1971. In its introduction it was pointed out that, although the coverage of purely chemical reactions was extensive, this was not quite so with papers dealing with production and reactions of excited species of the N - O system. Moreover, the reactions of molecular oxygen in excited singlet states ($a^1\Delta_g$, and $b^1\Sigma_g^+$), so important in the fields of pollution and atmospheric chemistry, were completely omitted.

*This publication is an activity of the Chemical Kinetics Information Center, N.B.S. The work was supported by the Office of Standard Reference Data, N.B.S. as part of a program to provide information and data on rates of chemical reactions.

The present supplement redeems our pledge made at the end of the introduction to the previous bibliography, namely that: "it is our plan to prepare a separate bibliography on the production and reactions of excited species of the N - O system."

However, from January 1971 until today an important number of papers dealing with purely chemical reactions of the N - O system were also published. Therefore, the aim of this supplement is manifold:

- 1) It lists all the pertinent papers and reports on the gas phase kinetics in the N - O system which appeared from January 1971 through January 1972.
- 2) It lists the earlier papers dealing with the same system, which were omitted in the 1971 bibliography. For instance, a large number of earlier papers dealing with vibrational and rotational relaxation of molecules in the N - O system, omitted in the NBS-OSRDB-71-2 publication, are now included in this supplement. Most of these papers are based on ultrasonic methods of measurement.
- 3) It lists a number of reactions dealing with N and O species in excited state which were not included in the earlier publication. The largest class belonging to this category is the production and reactions of molecular oxygen in an excited singlet state ($a^1\Delta_g$, $b^1\Sigma_g^+$, and $c^1\Sigma_u$). Its coverage, if not exhaustive, is extensive. It includes all the papers cited by Wayne in his review "Singlet Molecular Oxygen", Adv. in Photochem. 7, 311 (1969), as well as papers published after 1969. A small number of recent papers dealing with molecular oxygen in excited triplet state ($A^3\Sigma_u^+$, and $B^2\Sigma_u^-$) is also included.

It is our plan to prepare supplements to this bibliography every other year.

This bibliography is not the result of the effort of a single person, but of the whole staff of Chemical Kinetics Information Center. My thanks to all of them.

In particular, I wish to thank Dr. David Garvin, Director of the Center, for his more than helpful suggestions and constant guidance; Mr. James G. Koch, Supervisor, for tracking down and obtaining papers and reports otherwise very difficult to obtain; Mrs. Ann C. Robertson and Mrs. Geraldine W. Zumwalt, for typing a difficult manuscript with particular care.

GUIDELINES FOR THE USER

Arrangement of the report. This bibliography is in three parts:

Part I. Reactions of Nitrogen and Oxygen Species.

Part II. Reactions of Oxygen Species.

Part III. The combined bibliography for Parts I and II arranged alphabetically by authors. The complete reference citation for each article mentioned is given here. Occasionally explanatory notes are appended. These establish the "bibliography chain" for closely related papers by the same authors.

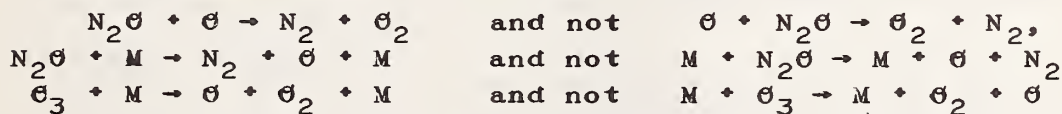
Parts I and II are arranged by reaction, following the order indicated below. At the end of these parts, the two sections I(b) and II(b) include a short list of critical reviews or surveys dealing with the reactions listed in sections I(a) and II(a), respectively.

Ordering of chemical reactions. The bibliography lists references to published papers and reports in which rate data are reported for reactions of N , N_2 , N_3 , N_2O , N_2O_2 , N_2O_3 , N_2O_4 , N_2O_5 , NO , NO_2 , NO_3 , NO_4 , O , O_2 and O_3 with each other. As written above, the sequence of these atoms or molecules defines the order in which the reactions are arranged, i. e.: semialphabetically, by first reactant.

Forward and reverse reactions are listed separately. Reactants are always on the left.

Within each reaction the reactants and products are arranged according to the same scheme: separately and alphabetically. The general "third body", is always last.

So, equations are written:



This ordering scheme runs counter to chemical conventions that order by oxidation state. It does bring the atom and its parent molecule together for this simple collection. The rule for arrangement is also simple. It is a character by character comparison of two formulae or equations from left to right, with the priority order being blank, numerals, and then letters; e.g.: N_2O_5 precedes NO .

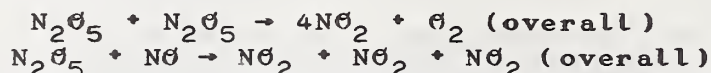
Chemical symbols without asterisk (ground state) take precedence over those with asterisk (excited state). e.g:



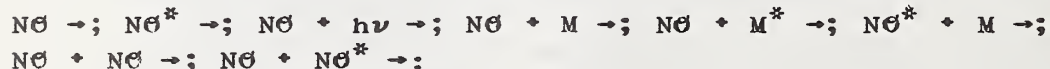
The chemical equations of the overall reactions are not always balanced. An unbalanced equation indicates that the author mentions the reactants and the products of the reaction without the help of an equation, or that the chemical equation given by the author is unbalanced.

Very often, a reference mentioning a reaction without a third body, M, will be found under a heading indicating the same reaction with M on both sides.

In order to render the chemical change occurring in a reaction easily observable to the eye, a reactant, or a product may appear two, or even three times in the same heading. E.g.:



How to find a reaction. It is felt that the most profitable method for finding references dealing with a certain reaction included in this bibliography, would be to consider first all headings with the same reactants, with or without third body M, with or without $h\nu$, in excited, or in ground state, and regardless of the products. Only thereafter, should the user accept, or reject a paper, according to his own objective. As an example: Decomposition of NO. The user should consider the reactions having on the left side:



Display of Chemical Reactions and Formulae. (a). General.

Most of the reactions listed in parts I and II show a chemical change. Some of these show a photolytic, chemiluminescent or energy transfer process that occurs simultaneously with the chemical change. In addition, there is an important number of reactions that are simply collisional energy transfer or photo-excitation processes.

An excited species is indicated by an asterisk placed between the symbol of the species and the bracket including its electronic configuration.

An electronic energy transfer from a lower to a higher excited state - or vice versa - is outlined by a double asterisk following the higher excited state. E.g.:

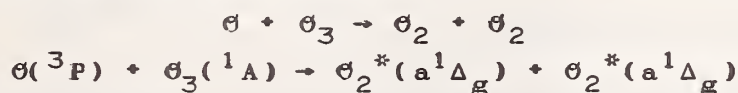


(b). Excited states of reactants and products. In part I, symbols defining electronic or vibronic states are very often omitted and an excited atom or molecule is indicated by a simple asterisk. However, for a number of papers, the electronic states are indicated in brackets placed after the short reference.

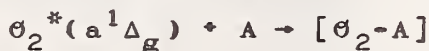
In part II, the arrangement of electronic symbols is different. Taking into account the large number of papers dealing with molecular oxygen in excited states, as well as the importance of excited oxygen species in the fields of air pollution and atmospheric chemistry, it was felt that a more detailed arrangement of the material included for reactions involving only oxygen species would be useful. For that reason, the electronic configuration of excited states is indicated in the chemical reaction itself, in a bracket following the excited atom or molecule (rather than being indicated at the end of the short reference, as in part I). E.g.:



As a general rule, if a reaction is purely chemical, the electronic configurations are omitted. However, if a reaction includes even a single electronically excited oxygen species, then the electronic configurations of all the O species (including the ground states) are indicated. The ground states are not followed by asterisks. E.g.:



In the special case when a molecule (or third body) acts as an acceptor for the excited oxygen species, it is indicated by the letter A (Acceptor). E.g.:

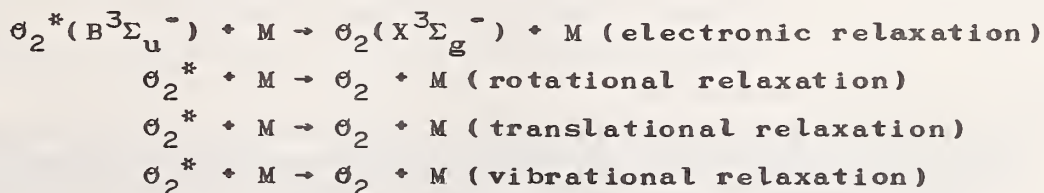


The order of priority of electronic states is based on the lowest minima of the potential energy curves, followed by the next lowest ones [see: Gilmore, F. R., "Potential Energy Curves for N₂, NO, O₂ and corresponding ions,"

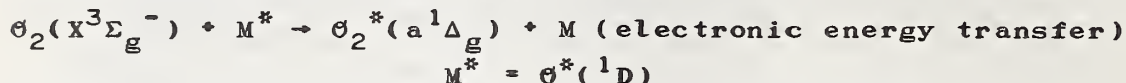
J. Quantit. Spectr. Rad. Trans. 5, 369 (1965)]. E.g.:

Priority of O atoms: O(^3P), O^*(^1D), O^*(^1S); Priority of O₂ molecules: O₂(X³Σ_g⁻); O₂^*(a¹Δ_g); O₂^*(b¹Σ_g⁺); O₂^*(c¹Σ_u⁻); O₂^*(A³Σ_u⁺); O₂^*(B³Σ_u⁻).

If several reactions differ only by the type of energy involved, being similar in every other respect, the priority is based on the nature of the energy, in the order: electronic, rotational, translational, vibrational. This rule applies to certain quenching, or energy transfer processes. The nature of the process is indicated in a bracket following the reaction. E.g.:



(c). Excitation of energy transfer agents ("third bodies"). An excited second, or third body is indicated by a second heading centered in the middle of the page. This arrangement results in grouping the reactions according to the second and third bodies. E.g.:



..... JCPA6-1971-54-4317

.....



Seaton, M. J. JATPA3-1954-4-295 (calculation)



Khan, et al. ESTHAG-1967-1-656 (mechanism)

Reference Citations.

The references under each reaction list the author(s) and the sources, in the following form:

Author(s)	Source-Year-Volume-Page	Number of Author(s)
Young, R. A.	JCPA6-1960-33-1112	1
Young and Black	JCPA6-1966-44-3741	2
Young, et al.	JCPA6-1968-49-4769	3 or more

Variations from this format (which we will call "short reference") are usually in the direction of more explicit specification. These variations are never made in the first two fields, source and year. They are fixed and always present.

The sources are indicated by their ASTM CODEN abbreviations*). A guide to these codes follows. As listed in this guide, the codes include an additional sixth cipher, which is a "check character"**. A code prefixed with an asterisk is a code not in the ASTM CODEN set. These are codes we have assigned for reports from industrial laboratories, research institutes and universities. When the CODEN system adopts appropriate codes they will be replaced. The present, temporary codes usually end with Z or U.

*) Blumenthal, J. G., Karaman, M., and Peters, A., Editors, "CODEN FOR PERIODICAL TITLES" (Including Non-Periodical Titles and Deleted Coden), Vol. I and II, ASTM Data Series DS 23B, (1970); First Supplement DS 23B - S1 (05-023021-42) (1972). (American Society for Testing and Materials, 1916 Race Street, Philadelphia, Penna. 19103).

JOURNAL AND REPORT CODES **

ACHRAY	Accounts of Chemical Research
ACUSAY	Acustica
ADCSAJ	Advances in Chemistry Series
ADPCA2	Advances in Photochemistry
AIAJAH	A.I.A.A. Journal (American Institute of Aeronautics and Astronautics)
AJCHAS	Australian Journal of Chemistry
AKZTAG	Akustische Zeitschrift (Zurich)
ANPHAJ	Annales de Physique (Paris)
ANPYA2	Annalen der Physik (Leipzig)
ANYAA9	Annals of the New York Academy of Sciences
APØPAI	Applied Optics
ASJØAB	Astrophysical Journal
*AVEVZJ	AVCØ - Everett Research Report
BAPSA6	Bulletin of the American Physical Society
BBPCAX	Berichte der Bunsengesellschaft fuer Physikalische Chemie
BCSJAB	Bulletin of the Chemical Society of Japan
BJAPAJ	British Journal of Applied Physics
BØØKA7	Book
BSCFAS	Bulletin de la Societe Chimique de France
CBSTB9	Combustion Science and Technology
CCØMA8	Chemical Communications. The Chemical Society (London)
CHDBAN	Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences. Serie B. Sciences Physiques
CHDCAQ	Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences. Serie C. Sciences Chimiques
CHPLBC	Chemical Physics Letters (Amsterdam)
CHREAY	Chemical Reviews
CJCHAG	Canadian Journal of Chemistry
CJPHAD	Canadian Journal of Physics
CØREAF	Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences, Paris
CRAUAX	Comptes Rendus (Doklady) de l'Academie des Sciences de l'URSS (Moscow)
CUSCAM	Current Science (India)
DAEBBA	Dissertation Abstracts International, B. The Sciences and Engineering (Ann Arbor, Mich.)
DFSØAW	Discussions of the Faraday Society

**The final sixth character in the journal code is a "check character". This is not shown in the listings in ASTM DS 23B and DS 23 S1, but the calculation is explained in the introductions to them. See also NBS Tech. Note 738 "Subroutine for the Calculation of CODEN Check Characters".

EENAA3	Ergebnisse der Exakten Naturwissenschaften
ENTPA5	Entropie. Revue Scientifique et Technique de Thermodynamique
ESTRAG	Enviromental Science and Technology
FPYKA6	Fortschritte der Physik
*GESLZ6	General Electric Company, Space Science Laboratory
HCACAV	Helvetica Chimica Acta
HIECAP	High Energy Chemistry (English)
IJCKB0	International Journal of Chemical Kinetics
JACSAT	Journal of the American Chemical Society
JAHSAK	Journal of Atmospheric Sciences
JAPIAU	Journal of Applied Physics
JASMAN	Journal of the Acoustical Society of America
JATPA3	Journal of Atmospheric and Terrestrial Physics
JCPQAY	Journal de Chimie Physique
JCPSA6	Journal of Chemical Physics
JCS0A9	Journal of the Chemical Society (London)
JGREA2	Journal of Geophysical Research
J0PYA6	Journal of Physics (Moscow)
J0SAAH	Journal of the Optical Society of America
JPCHAX	Journal of Physical Chemistry
JQSRAE	Journal of Quantitative Spectroscopy and Radiative Transfer
JTEPAR	Journal of Atmospheric and Terrestrial Physics. Special Supplements (London)
MCHEBQ	mechanical and Chemical Engineering Transaction, Institution of Engineering (Australia)
MFMPA2	Massachusetts Institute of Technology, Fluid Mechanics Laboratory, Publications (Cambridge)
NATUAS	Nature (London)
NATWAY	Naturwissenschaften
NUCIAD	Nuovo Cimento
0PSUA3	Optics and Spectroscopy (U.S.S.R.)
PAAAAV	Proceeding of the American Academy of Arts and Sciences
PAPHAP	Pure and Applied Physics
PCPSA4	Proceedings of the Cambridge Philosophical Society
PFLDAS	Physics of Fluids
PHCBAP	Photochemistry and Photobiology
PHDTAG	PhD Thesis
PHMAA4	Philosophical Magazine
PHRVA0	Physical Review
PHYSAG	Physica. (Utrecht, Netherlands)
PHZFAG	Physikalische Zeitschrift
PKAWAV	Koninklijke Akademie van Wetenschappen te Amsterdam, Proceedings
PLRAAN	Physical Review, A (New York) (1970+)
PLSSAE	Planetary and Space Science

PPSAAM Proceedings of the Physical Society (London),
 Section A
 PPS0AU Proceedings of the Physical Society (London)
 PRLAAZ Proceedings of the Royal Society (London), Series A
 Mathematical and Physical Sciences
 PRLTA0 Physical Review Letters
 PRVAAH Physical Review, Series A
 QJRMAM Quarterly Journal of the Royal Meteorological Society
 RJPCAR Russian Journal of Physical Chemistry (USSR) English
 Translation
 RMPHAT Reviews of Modern Physics
 *RPREZ8 Rocket Propulsion Est., Westcott, United Kingdom,
 Technical Report
 RVGPA3 Reviews of Geophysics
 SCIEAS Science. American Association for the Advancement of
 Science
 SPIPAG Scientific Papers of the Institute of Physical and
 Chemical Research (Tokyo)
 SYMCAQ Symposium on Combustion
 TAGUAT Transactions of the American Geophysical Union
 TFS0A4 Transactions of the Faraday Society
 ZENAAU Zeitschrift fuer Naturforschung Pt. A. Astrophysik,
 Physik und Physikalische Chemie
 ZEPYAA Zeitschrift fuer Physik
 ZPCBAL Zeitschrift fuer Physikalische Chemie, Abteilung B.
 Chemie der Elementarprozesse, Aufbau der Materie
 ZPCFAX Zeitschrift fuer Physikalische Chemie, Neue Folge
 (Frankfurt)
 ZTPHAU Zeitschrift fuer Technische Physik
 24ZVAA Chemical Reactions in Urban Atmosphere, Proceedings
 of the Symposium Held at General Motors Research
 Laboratories, Warren, Mich., 1969

I(a). REACTIONS INVOLVING N AND O SPECIES



Meyer, et al.

JPCHAX-1970-74-2238 [$N^*(^2P)$;
 $M^* = N_2^*(A^3\Sigma_u^+, v = 0, 1)$]



Donovan and Husain

CHREAY-1970-70-489 (2D) (review)

Hunten and McElroy

RVGPA3-1966-4-303 [2D , or 2P]
 (review)

Meyer, et al.

JPCHAX-1970-74-2238 [$N^*(^2P)$]

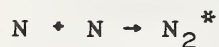
Seaton, M. J.

JTEPAR-1955-5-289 [$N^*(^2D)$]



Wallace and McElroy

PLSSAE-1966-14-677 [$N^*(^2D)$;
 $M^* = O_2^*(^1\Delta_g, ^1\Sigma_g^+)$]



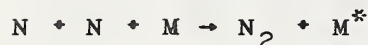
Ghosh and Jain

CUSCAM-1971-40-29



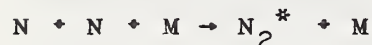
Broemer and Zwirner
 Shui, et al.

ZENAAU-1969-24-118
 SYMCAQ-1971-13-21 (calculation)



Schofield, K.

PLSSAE-1965-15-643



Brennen and Shane

JPCHAX-1971-75-1552 [$N_2^*(^5\Sigma$, or
 $B^3\Pi_g$, or $A^3\Sigma_u^+)$]

Campbell and Thrush

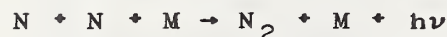
PRLAAZ-1967-296-201 [$N_2^*(A^3\Sigma_u^+)$]

Golde and Thrush

CHPLBC-1971-8-375 [$N_2^*(a^1\Pi_g)$]
 (calculation)

Ghosh and Jain

CUSCAM-1971-40-29



Brennen and Shane

JPCHAX-1971-75-1552



Schofield, K.

PLSSAE-1965-15-643

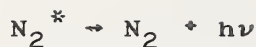


Groth and Schierholz

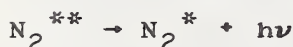
PLSSAE-1959-1-333 (mechanism)

$N + NO \rightarrow N_2 + O$ (Continued)

Yang and Servodio	JCPSA6-1967-47-4817 (quantum yield)
$N + NO \rightarrow N_2^* + O$	
Schofield, K.	PLSSAE-1965-15-643
$N + NO^* \rightarrow N_2 + O^*$	
Fontijn and Ellison	JPCHAX-1968-72-3701 [$NO^*(a^4\Pi_1)$; $O^*(^1S)$] (mechanism)
$N + NO_2 \rightarrow N_2 + O + O$	
Schofield, K.	PLSSAE-1965-15-643
$N + NO_2 \rightarrow N_2^* + O_2$	
Schofield, K.	PLSSAE-1965-15-643
$N + NO_2 \rightarrow N_2O + O$	
Schofield, K.	PLSSAE-1965-15-643
$N + NO_2 \rightarrow NO + NO^*$	
Schofield, K.	PLSSAE-1965-15-643
$N + O + M \rightarrow NO + M$	
Broemer and Zwirner Shui, et al.	ZENAAU-1969-24-118 SYMCAQ-1971-13-21 (calculation)
$N + O + M \rightarrow NO + M^*$	
Schofield, K.	PLSSAE-1965-15-643
$N + O + M \rightarrow NO^* + M$	
Roth, W.	JCPSA6-1961-34-999 [$NO^*(A^2\Sigma^+, v=3)$] (mechanism)
$N + O^* + M \rightarrow NO^* + M$	
Fontijn and Ellison	JPCHAX-1968-72-3701 [$NO^*(a^4\Pi_1$, or $b^4\Sigma^-)$; $O^*(^1D)$] (mechanism)
$N + O_2 \rightarrow NO + O$	
Bowman, C. T. Livesey, et al.	CBSTB9-1971-3-37 (review) CBSTB9-1971-4-9
$N + O_2 \rightarrow NO^* + O$	
Schofield, K.	PLSSAE-1965-15-643
$N + O_3 \rightarrow NO + O_2$	
Schofield, K.	PLSSAE-1965-15-643



Borst and Zipf	PLRAAN-1971-3-979 [$N_2^*(a^1\Pi_g, \text{ or } E^3\Sigma_g^+)$]
Brennen and Shane	JPCHAX-1971-75-1552 [$N_2^*(B^3+_g)$]
Broemer and Spieweck	PLSSAE-1967-15-689 [$N_2^*(A^3\Sigma_u^+)$]
Carleton and Oldenburg	JCPSA6-1962-36-3460 [$N_2^*(A^3\Sigma_u^+)$]
Freund, R. S.	JCPSA6-1969-50-3734 [$N_2^*(E^3\Sigma_g^+)$]
Hesser, J. E.	JCPSA6-1968-48-2518 [$N_2^*(p'^1\Sigma_u^+)$]
Hesser and Dressler	JCPSA6-1966-45-3149 [$N_2^*(p'^1\Sigma_u^+)$]
Holland, R. F.	JCPSA6-1969-51-3940 [$N_2^*(a^1\Pi_g)$]
Meyer, et al.	JCPSA6-1971-55-2084 [$N_2^*(A^3\Sigma_u^+)$]
Schultz, H. A.	JCPSA6-1966-44-377 [$N_2^*(C^3\Pi_u)$]
Shemansky, D. E.	JCPSA6-1969-51-689 [$N_2^*(A^3\Sigma_u^+)$]
Shemansky and Carleton	JCPSA6-1969-51-682 [$N_2^*(A^3\Sigma_u^+)$]
Tinti and Robinson	JCPSA6-1968-49-3229 [$N_2^*(A^3\Sigma_u^+)$]
Wentink and Isaacson	JCPSA6-1967-46-822 [$N_2^*(^3\Sigma_u^+)$]
Young, R. A.	JCPSA6-1960-33-1112 [$N_2^*(B^3\Sigma_g)$]
Young and St. John	ADCSAJ-1969-80-105 [$N_2^*(A^3\Sigma_u^+, v = 0, 1)$]
Zelikoff and Aschenbrand	JCPSA6-1957-27-123 [$N_2^*(B^3\Pi_g)$] (mechanism)
Zipf, E. C., Jr.	JCPSA6-1963-39-3534 [$N_2^*(A^3\Sigma_g^+)$]
Zipf, E. C., Jr.	BAPSA6-1964-9-185 [$N_2^*(A^3\Sigma_u^+)$]
Zipf, E. C., Jr.	BAPSA6-1965-10-179 [$N_2^*(A^3\Sigma_u^+)$]



Beale and Broida	JCPSA6-1959-31-1030 [$C^3\Pi_u \rightarrow B^3\Pi_g;$ or $B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Bennett and Dalby	JCPSA6-1959-31-434 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Brocklehurst, B.	TFSOA4-1964-60-2151 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Brocklehurst and Downing	JCPSA6-1967-46-2976 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Broemer and Zwirner	ZENAAU-1969-24-118 [$B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Calo and Axtmann	JCPSA6-1971-54-4961 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Fontijn and Ellison	JPCHAX-1968-72-3701 [$B^3\Pi_g \rightarrow A^3\Sigma_u^+$] (mechanism)

$N_2^{**} \rightarrow N_2^* + h\nu$ (Continued)

Hesser, J. E.	JCPSA6-1968-48-2518 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Jonathan and Petty	JCPSA6-1969-50-3804 [$B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Schmidt, K.	ZENAAU-1956-11-1023 [$N_2^{**}(^3\Pi_u) \rightarrow N_2^*(B^3\Pi_g)$]
Shemansky and Carleton	JCPSA6-1969-51-682 [$B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Stanley, C. R.	PPSAAM-1955-68-709 [$C^3\Pi_u \rightarrow B^3\Pi_g$; or $B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Tanaka and Jursa	JOSAAH-1961-51-1239 [$C^3\Pi_u \rightarrow B^3\Pi_g$; or $B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Tinti and Robinson	JCPSA6-1968-49-3229 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Wagner, K. H.	ZENAAU-1964-19-716 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Wentink and Isaacson	JCPSA6-1967-46-822 [$B^3\Pi_g \rightarrow A^3\Sigma_u^+$]

$N_2^* + M \rightarrow N + N + M$

Golde and Thrush	CHPLBC-1971-8-375 [$N_2^*(a^1\Pi_g)$] (calculation)
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$N_2 + M \rightarrow N_2^* + M$ (electronic excitation)

Engelhardt, et al.	PRVAAH-1964-135-1566 [$N_2^*(A^3\Sigma_u^+, a^1\Pi_g, \text{ or } C^3\Pi_u)$]
Fishburne, E. S.	JCPSA6-1967-47-58
Gilmore, et al.	JQSRAE-1969-9-157 [$N_2^*(A^3\Sigma_u^+, \text{ or } a^1\Pi_g)$] (evaluation)
Losev and Smekhov	OPSUA3-1967-22-484 [$N_2^*(B^3\Pi_g)$]

$N_2 + M \rightarrow N_2^* + M$ (vibrational excitation)

Engelhardt, et al.	PRVAAH-1964-135-1566
Gilmore, et al.	JQSRAE-1969-9-157 (evaluation)
Schultz, G. J.	PHRVAO-1959-116-1141
Schultz, G. J.	PHRVAO-1962-125-229
Schultz, G. J.	PRVAAH-1964-135-988
Taylor, et al.	SYMCAQ-1967-11-49

$N_2 + M^* \rightarrow N_2^* + M$ (energy transfer)

Andreev, E. A.	CHPLBC-1971-11-429 (calculation)
Bauer and Roesler	ZENAAU-1964-19-656
Billingsley and Callear	TFSOA4-1971-67-257
Bortner, et al.	*GESLZ6-1970-RPT/DASA-2560 (review)
Callear, A. B.	DFSOW-1962-33-28

$N_2 + M^* \rightarrow N_2^* + M$ (energy transfer) (Continued)

Callear and Wood	TFS0A4-1971-67-598 [$N_2^*(A^3\Sigma_u^+)$]
Calo and Axtmann	JCPA6-1971-54-4961 [$N_2^*(C^3\Pi_u)$]
Fishburne, E. S.	JCPA6-1967-47-58 [$N_2^*(C^3\Pi_u)$]
Granzow, et al.	JPCA6-1968-72-1402 [$N_2^*(A^3\Sigma_u^+)$]
Moore, C. B.	ACHRAY-1969-2-103 (review)
Prince, et al.	JCPA6-1964-40-2619 [$N_2^*(C^3\Pi_u)$; $M^* = Ar^*$]
Rosser, et al.	JCPA6-1969-50-4996
Sato and Tsuchiya	CHPLBC-1970-5-293
Schmidt, K.	ZENAAU-1956-11-1023
Schultz, H. A.	JCPA6-1966-44-377 [$N_2^*(C^3\Pi_u)$; $M^* = Ar^*$]
Sharma and Brau	PRLTA0-1967-19-1273 (calculation)
Sharma and Brau	JCPA6-1969-50-924 (calculation)
Taylor and Bitterman	BAPSA6-1968-13-1591
Taylor and Bitterman	JCPA6-1969-50-1720
Taylor and Bitterman	RMPHAT-1969-41-26 (review)
Taylor, et al.	SYMCAQ-1967-11-49
White, D. R.	JCPA6-1968-49-5472
Young and Sharpless	JCPA6-1963-39-1071 [$M^* = O^*(^1S)$]

$N_2 + M^{**} \rightarrow N_2^* + M^*$ (energy transfer)

Young and Sharpless	JCPA6-1963-39-1071 [$M^{**} = O^*(^1S)$; $M^* = O^*(^1D)$]
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$N_2^* + M \rightarrow N_2 + M$ (electronic relaxation)

Callear and Wood	TFS0A4-1971-67-598 [$N_2^*(A^3\Sigma_u^+)$]
Flagan and Appleton	MFMPA2-1971-71-7 [$N_2^*(A^3\Sigma_u^+)$]
Golde and Thrush	CHPLBC-1971-8-375 [$N_2^*(a^1\Pi_g)$]
Hunten and McElroy	RVGPA3-1966-4-303 [$N_2^*(A^3\Sigma_u^+)$] (review)
Meyer, et al.	JCPA6-1971-55-2084 [$N_2^*(A^3\Sigma_u^+)$]
Ølmsted, et al.	JCPA6-1965-42-2321 [$N_2^*(a^1\Pi_g)$]
Schultz, H. A.	JCPA6-1966-44-377 [$N_2^*(C^3\Pi_u)$]
Weinreb and Mannella	JCPA6-1969-50-3129 [$N_2^*(A^3\Sigma_u^+)$]
Weinreb and Mannella	JCPA6-1969-51-4973 [$N_2^*(A^3\Sigma_u^+)$]
Young, R. A.	JCPA6-1960-33-1112 [$N_2^*(a^1\Pi_g)$, $v = n$; or $B^3\Pi_g$]
Zipf, E. C., Jr.	BAPSA6-1964-9-185 [$N_2^*(A^3\Sigma_u^+)$]
Zipf, E. C., Jr.	BAPSA6-1965-10-179 [$N_2^*(A^3\Sigma_u^+)$]

$N_2^* + M \rightarrow N_2 + M$ (rotational relaxation)

Brout, R.	JCPSA6-1954-22-1189 (calculation)
Cottrell and McCoubrey	BØØKA7-1961-81 (review)
Fujii, et al.	JASMAN-1962-34-714
Fujii, et al.	JASMAN-1963-35-961
Greene and Hornig	JCPSA6-1953-21-617
Greenspan, M.	JASMAN-1958-30-672
Greenspan, M.	JASMAN-1959-31-155
Herzfeld and Litovitz	PAPHAP-1959-7-238 (review)
Holmes, et al.	TFSØA4-1962-58-2342
Jonathan and Petty	JCPSA6-1969-50-3804
Miyama and Endoh	JCPSA6-1967-46-2011
Ø'Brien and Robinson	CHPLBC-1971-8-79 (calculation)
Parbrook and Tempest	ACUSAY-1958-8-345
Parker, J. G.	PFLDAS-1959-2-449
Parker, et al.	JASMAN-1953-25-263
Sessler, G.	ACUSAY-1958-8-395
Sivian, L. J.	JASMAN-1947-19-914
Winter and Hill	JASMAN-1967-42-848
Zartman, I. F.	JASMAN-1949-21-171
Zmuda, A. J.	JASMAN-1951-23-472

$N_2^* + M \rightarrow N_2 + M$ (translational relaxation)

Miyama and Endoh	JCPSA6-1967-46-2011
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$N_2^* + M \rightarrow N_2 + M$ (vibrational relaxation)

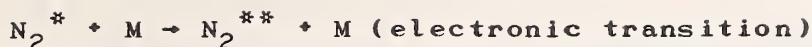
Appleton, J. P.	JCPSA6-1967-47-3231
Appleton and Steinberg	JCPSA6-1967-46-1521
Arnold, et al.	TFSØA4-1957-53-738 (calculation)
Bauer and Roesler	ZENAAU-1964-19-656
Bender, D.	ANPYA2-1940-38-199
Benson and Berend	JCPSA6-1966-44-470 (calculation)
Boyer, R. A.	JASMAN-1951-23-176
Breshears and Bird	JCPSA6-1968-48-4768
Callear and Wood	TFSØA4-1971-67-272
Cary, B.	PFLDAS-1965-8-26
Clouston, et al.	PRLAAZ-1958-248-429
Cottrell and McCoubrey	BØØKA7-1961-80 (review)
Dixon, et al.	PRLAAZ-1922-100-1
Fritzsche, L.	ACUSAY-1960-10-189
Griffith, W.	JAPIAU-1950-21-1319
Griffith, et al.	PHRVAØ-1956-102-1209
Guenoche, et al.	ENTPA5-1970-34-35-49
Henry, P. S. H.	PCPSA4-1932-28-249 (calculation)
Herzfeld and Litovitz	PAPHAP-1959-7-241 (review)
Huber and Kantrowitz	JCPSA6-1947-15-275
Jonathan and Petty	JCPSA6-1969-50-3804
Keesom and Lammeren	PKAWAV-1932-35-727
Keller, H. H.	PHZFAG-1940-41-386
Kneser, H. Ø.	EENAA3-1949-22-121 (review)
Knoetzel, H.	AKZTAG-1940-5-245
Lukasik and Young	JCPSA6-1957-27-1149
McCoubrey, et al.	TFSØA4-1961-57-1472 (review)
Miyama and Endoh	JCPSA6-1967-46-2011
Moore, et al.	JCPSA6-1967-46-4222
Morgan and Schiff	CJCHAG-1963-41-903
Øberst, H.	AKZTAG-1937-2-76
Ø'Brien and Robinson	CHPLBC-1971-8-79 (calculation)
Parker, J. G.	PFLDAS-1959-2-449
Parker, R. C.	PPSØAU-1937-49-95
Parker, et al.	JASMAN-1953-25-263
Schmidtmueller, N.	AKZTAG-1938-3-115

$N_2^* + M \rightarrow N_2 + M$ (vibrational relaxation) (Continued)

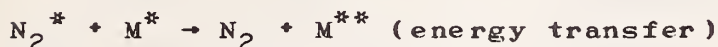
Schweikert, G.	ANPYA2-1915-48-593
Sessler, G.	ACUSAY-1958-8-395
Sivian, L. J.	JASMAN-1947-19-914
Starr and Shaw	JCPA6-1966-44-4181
Taylor and Bitterman	RMPHAT-1969-41-26 (review)
Taylor, et al.	SYMCAQ-1967-11-49
Tempest and Parbrook	ACUSAY-1957-7-354
Tsuchiya, S.	BCSJAB-1964-37-828
Van Iitterbeek and Mariens	PHYSAG-1937-4-207
White, D. R.	JCPA6-1968-48-525
White, D. R.	JCPA6-1968-49-5472
Zartman, I. F.	JASMAN-1949-21-171
Zmuda, A. J.	JASMAN-1951-23-472

$N_2^* + M \rightarrow N_2 + M^*$ (energy transfer)

Bauer and Roesler	ZENAAU-1964-19-656
Breshears and Bird	JCPA6-1968-48-4768
Callear and Wood	TFSOA4-1971-67-272 [$A^3\Sigma_u^+$, $v = 0, 1$]
Cheo, P. K.	JAPIAU-1967-38-3563
Fontijn and Ellison	JPCHAX-1968-72-3701 [$N_2^*(A^3\Sigma_u^+)$; $M^* = N\theta^*(A^2\Sigma^+)$, or $\theta^*(^1S)$] (mechanism)
Golde and Thrush	CHPLBC-1971-8-375 [$N_2^*(a^1\Pi_g)$]
Hurle, I. R.	JCPA6-1964-41-3911
Mentall, et al.	DFSAAW-1967-44-157
Meyer, et al.	ASJAB-1969-157-1023 [$N_2^*(A^3\Sigma_u^+)$; $M^* = \theta^*(^1S)$, or θ_2^*]
Meyer, et al.	JPCHAX-1970-74-2238 [$N_2^*(A^3\Sigma_u^+$, $v = 0, 1)$; $M^* = N^*(^2P)$, or $\theta^*(^1S)$]
Meyer, et al.	JCPA6-1971-55-2084 [$N_2^*(A^3\Sigma_u^+)$]
Moore, C. B.	ACHRAY-1969-2-103 (review)
Moore, et al.	JCPA6-1967-46-4222
Parkinson and Zipf	PLSSAE-1970-18-895 [$N_2^*(A^3\Sigma_u^+)$; $M^* = \theta^*(^1S)$]
Phillips, L. P.	CJCHAG-1965-43-369 [$N_2^*(A^3\Sigma_u^+)$; $M^* = I_2^*$]
Rosser, et al.	JCPA6-1969-50-4996
Starr, W. L.	JCPA6-1965-43-73
Starr and Shaw	JCPA6-1966-44-4181
Taylor and Bitterman	BAPSA6-1968-13-1591
Taylor and Bitterman	RMPHAT-1969-41-26 (review)
Taylor, et al.	SYMCAQ-1967-11-49
White, D. R.	JCPA6-1968-49-5472
Young and St. John	ADCSAJ-1969-80-105 [$N_2^*(A^3\Sigma_u^+)$, $v = 0, 1$; $M^* = N\theta^*(A^2\Sigma^+, v = 0, 1)$]



Golde and Thrush	CHPLBC-1971-8-375 [$B^3\Pi_g \rightarrow a^1\Pi_g$]
Weinreb and Mannella	JCPSA6-1969-50-3129 [$A^3\Sigma_u^+ \rightarrow B^3\Pi_g$]
Weinreb and Mannella	JCPSA6-1969-51-4973 [$A^3\Sigma_u^+ \rightarrow B^3\Pi_g$]
Young and St. John	ADCSAJ-1969-80-105 [$N_2^*(A^3\Sigma_u^+) \rightarrow N_2^{**}$]



Stedman and Setser	JCPSA6-1969-50-2256 [$M^* = N_2^*(A^3\Sigma_u^+)$; $M^{**} = N_2^{**}(C^3\Pi_u)$]
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Brennen and Shane	JPCHAX-1971-75-1552 [$^5\Sigma \rightarrow B^3\Pi_g \rightarrow A^3\Sigma_u^+$]
Brocklehurst, B.	DFS0AW-1962-33-88 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Brocklehurst, B.	TFS0A4-1964-60-2151 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Brocklehurst and Downing	JCPSA6-1967-46-2976 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Freund, R. S.	JCPSA6-1969-50-3734 [$E^3\Sigma_g^+ \rightarrow C^3\Pi_u$, or $B^3\Pi_g$, or $A^3\Sigma_u^+$]
Oldenberg, O.	PLSSAE-1959-1-40 [$a^1\Pi_g \rightarrow B^3\Pi_g$]
Schmidt, K.	ZENAAU-1956-11-1023 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Wagner, K. H.	ZENAAU-1964-19-716 [$C^3\Pi_u \rightarrow B^3\Pi_g$]
Young and Black	JCPSA6-1966-44-3741 [$^5\Sigma_g^+ \rightarrow B^3\Pi_g$]



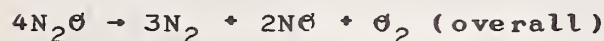
Bowman, C. T.	CBSTB9-1971-3-37 (review)
Livesey, et al.	CBSTB9-1971-4-9



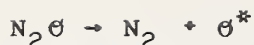
Seaton, M. J.	JATPA3-1954-4-295 [$O^*(^1D)$] (upper limit estimate)
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Stuhl and Niki	JCPSA6-1971-55-3943
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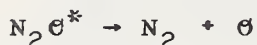


Gedye, G. R.	JCS0A9-1931-3016
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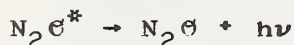
Gedye, G. R.

JCSØA9-1931-3016 (mechanism)



Bell, et al.
Bunker, D. L.
Gill and Laidler
Tschuikow-Roux, E.

JCSØA9-1955-1440
JCPSA6-1964-40-1946 (calculation)
PRLAAZ-1959-250-121 (calculation)
JPCHAX-1969-73-3891 (calculation)



Gerlovin and Orlova

ØPSUA3-1964-16-9



Briner and Karbassi
Dodge and Heicklen
Groth and Schierholz
Yang and Servedio

HCACAV-1945-28-1204
IJCKBØ-1971-3-269 (quantum yield)
PLSSAE-1959-1-333 (quantum yield)
JCPSA6-1967-47-4817 (quantum
yield)

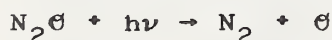


Zelikoff and Aschenbrand JCPSA6-1957-27-123 [$\text{NØ}^*(\text{A}^2\Sigma^+)$]
(quantum yield)



Dodge and Heicklen

IJCKBØ-1971-3-269 [$\text{N}^*(^2\text{D})$]
(quantum yield)



Briner and Karbassi
Greenberg and Heicklen
Dodge and Heicklen
Groth and Schierholz

HCACAV-1945-28-1204
IJCKBØ-1970-2-185
IJCKBØ-1971-3-269 (quantum yield)
PLSSAE-1959-1-333 (quantum yield)



Dodge and Heicklen

IJCKBØ-1971-3-269 [$\theta^*(^1\text{D})$]
(quantum yield)

Greenberg and Heicklen

IJCKBØ-1970-2-185 [$\theta^*(^1\text{D}$ or $^1\text{S})$]

Paraskevopoulos, et al.

JCPSA6-1971-54-3907 [$\theta^*(^1\text{D})$]
(quantum yield)

Yang and Servedio

JCPSA6-1967-47-4817 [$\theta^*(^1\text{S})$]
(quantum yield)



Dodge and Heicklen

IJCKBØ-1971-3-269 [$\text{N}_2^*(\text{A}^3\Sigma_u^+)$]
(quantum yield)

Zelikoff and Aschenbrand JCPSA6-1957-27-123 [$\text{N}_2^*(\text{B}^3\Pi_g)$]

(quantum yield)

$N_2O + M^* \rightarrow N + NO + M$
 Manning and Noyes JACSAT-1932-54-3907

$N_2O + M^* \rightarrow N + NO^* + M$
 Prince, et al. JCPSA6-1964-40-2619 [$NO^*(B^2\Pi_r)$;
 $M^* = Ar^*$]

$N_2O + M \rightarrow 1/2N_2 + NO + M$ (overall)
 Mahenc, et al. CHDCAQ-1971-272-345

$N_2O + M \rightarrow N_2 + O + M$
 Batten and Johnston IJCKB0-1971-3-381
 Bunker, D. L. JCPSA6-1962-37-393 (calculation)
 Garnett, et al. JCPSA6-1969-51-84
 Gedye, G. R. JCS0A9-1931-3016 (mechanism)
 Gilbert and Ross AJCHAS-1971-24-1541 (calculation)

$N_2O + M^* \rightarrow N_2 + O + M$
 Cvetanovic, R. J. JCPSA6-1955-23-1203 (mechanism)
 Cvetanovic, R. J. JCPSA6-1955-23-1208
 Manning and Noyes JACSAT-1932-54-3907
 Simonaitis and Heicklen IJCKB0-1971-3-319 [$M^* = Hg^*$]

$N_2O + M^* \rightarrow N_2 + O^* + M$
 Cvetanovic, R. J. JCPSA6-1955-23-1203 (mechanism)
 Manning and Noyes JACSAT-1932-54-3907 [$O^*(^1D)$]
 (mechanism)
 Zelikoff and Aschenbrand JCPSA6-1957-27-123 [$O^*(^1S)$;
 $M^* = N_2^*(B^3\Pi_g)$] (mechanism)

$N_2O + M \rightarrow N_2 + 1/2O_2 + M$ (overall)
 Bodenstein and Jost B00KA7-1941-267 (review)
 Foong, et al. MCHEBQ-1970-6-25
 Mahenc, et al. CHDCAQ-1971-272-345

$N_2O + M \rightarrow N_2O^* + M$ (vibrational excitation)
 Bell, et al. JCS0A9-1955-1440
 Gill and Laidler PRLAAZ-1959-250-121 (calculation)
 Tschuikow-Roux, E. JPCHAX-1969-73-3891 (calculation)

$N_2O + M^* \rightarrow N_2O^* + M$ (energy transfer)
 Callear and Wood TFS0A4-1971-67-272
 Moore, C. B. ACHRAY-1969-2-103 (review)

$N_2O^* + M \rightarrow N_2O + M$ (vibrational relaxation)
 Abello, T. P. PHRVA0-1928-31-1083
 Arditi, et al. CHDBAN-1970-270-477
 Arnold, et al. TFS0A4-1957-53-738 (calculation)
 Arnold, et al. PRLAAZ-1958-248-445

$N_2\theta^* + M \rightarrow N_2\theta + M$ (vibrational relaxation) (Continued)

Bates, et al.	JCPA6-1968-49-1432
Bell, et al.	JCSA9-1955-1440
Bunker, D. L.	JCPA6-1964-40-1946 (calculation)
Buschmann and Schaefer	ZPCBAL-1941-50-73
Cottrell and McCoubrey	BOKA7-1961-93 (review)
Cottrell, et al.	TFSOA4-1966-62-2655
Cottrell, et al.	TFSOA4-1967-63-2093
Dickens and Ripamonti	TFSOA4-1961-57-735
Dixon, et al.	PRLAAZ-1922-100-1
Eucken and Jaacks	ZPCBAL-1935-30-85
Eucken and Nuemann	ZPCBAL-1937-36-163
Griffith, W.	JAPIAU-1950-21-1319
Griffith, et al.	PHRVAO-1956-102-1209
Herzfeld and Litovitz	PAPHAP-1959-7-252 (review)
Jacox and Bauer	JPCHAX-1957-61-833
Kneser, H. O.	EENAA3-1949-22-121 (review)
Kneser and Zühlke	ZEPYAA-1932-77-649
Kuechler, L.	NATWAY-1938-26-104
McCoubrey, et al.	TFSOA4-1961-57-1472 (review)
Penman, H. L.	PPSAU-1935-47-543
Railston and Richardson	PPSAU-1935-47-533
Richardson, E. G.	PRLAAZ-1934-146-56
Schweikert, G.	ANPYA2-1915-48-593
Shilling, W. G.	PHMSAO-1927-3-273
Slobodskaya and Tkachenko	OPSUA3-1967-23-256
Wight, H. M.	JASMAN-1956-28-459
Yardley, J. T.	JCPA6-1968-49-2816

$N_2\theta^* + M \rightarrow N_2\theta + M^*$ (energy transfer)

Moore, C. B.	ACHRAY-1969-2-103 (review)
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$N_2\theta + N\theta \rightarrow N_2 + N\theta_2$

Batten and Johnston	IJCKBO-1971-3-381
Schofield, K.	PLSSAE-1965-15-643

$N_2\theta + N\theta_2 \rightarrow N_2 + N\theta + \theta_2$

Batten and Johnson	IJCKBO-1971-3-381
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$N_2\theta + \theta \rightarrow N_2 + \theta_2^*$

Schofield, K.	PLSSAE-1965-15-643
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$N_2\theta + \theta \rightarrow N\theta + N\theta^*$

Schofield, K.	PLSSAE-1965-15-643
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$N_2\theta + \theta^* \rightarrow N + N\theta_2$

Scott, et al.	CJCHAG-1971-49-1808 [$\theta^*(^1D)$]
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$N_2\theta + \theta \rightarrow N_2 + \theta_2$

Groth and Schierholz	PLSSAE-1959-1-333 (mechanism)
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$N_2\theta + \theta^* \rightarrow N_2 + \theta_2$

Dodge and Heicklen	IJCKBO-1971-3-269 [$\theta^*(^1D$ or $^1S)$]
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$N_2O + O^* \rightarrow N_2 + O_2$ (Continued)

Goldman, et al.	IJCKB0-1971-3-501 [$O^*(^1D)$]
Greenberg and Heicklen	IJCKB0-1970-2-185 [$O^*(^1D)$]
Greenberg and Heicklen	IJCKB0-1972-4-417 [$O^*(^1D)$]
Paraskevopoulos, et al.	JCPA6-1971-54-3907 [$O^*(^1D)$]
Scott, et al.	CJCHAG-1971-49-1808 [$O^*(^1D)$]
Yang and Servedio	JCPA6-1967-47-4817 [$O^*(^1S)$] (quantum yield)
Zelikoff and Aschenbrand	JCPA6-1957-27-123 [$O^*(^1S)$] (mechanism)

$N_2O + O \rightarrow NO + NO$

Groth and Schierholz	PLSSAE-1959-1-333 (mechanism)
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$N_2O + O^* \rightarrow NO + NO$

Dodge and Heicklen	IJCKB0-1971-3-269 [$O^*(^1D \text{ or } ^1S)$]
Gedye, G. R.	JCSA9-1931-3016 (mechanism)
Goldman, et al.	IJCKB0-1971-3-501 [$O^*(^1D)$]
Greenberg and Heicklen	IJCKB0-1970-2-185 [$O^*(^1D)$]
Greenberg and Heicklen	IJCKB0-1972-4-417 [1D]
Paraskevopoulos, et al.	JCPA6-1971-54-3907 [$O^*(^1D)$]
Scott, et al.	CJCHAG-1971-49-1808 [$O^*(^1D)$]
Yang and Servedio	JCPA6-1967-47-4817 [$O^*(^1S)$] (quantum yield)
Zelikoff and Aschenbrand	JCPA6-1957-27-123 [$O^*(^1S)$] (mechanism)

$N_2O + O_2^* \rightarrow N_2 + O_3$

Goldman, et al.	IJCKB0-1971-3-501
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$N_2O_3^* + M \rightarrow N_2O_3 + M$ (vibrational relaxation)

Bauer, et al.	ACUSAY-1959-9-181
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$N_2O_4^* \rightarrow NO_2 + NO_2$

Sharma, et al.	JPCHAX-1970-74-923
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$N_2O_4 + M \rightarrow NO_2 + NO_2 + M$

Blend, H.	JASMAN-1970-47-757
Keck and Kalelkar	*AVEVZJ-1968-RPT/289 (calculation)

$N_2O_4^* + M \rightarrow N_2O_4 + M$ (vibrational relaxation)

Bauer, et al.	ACUSAY-1959-9-181
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$N_2O_4 + O^* \rightarrow N_2O_3 + O_3$

Paraskevopoulos, et al.	JCPA6-1971-54-3907 [$O^*(^1D)$]
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- $N_2O_4 + O^* \rightarrow NO + NO_2 + O_2$
 Paraskevopoulos, et al. JCPSA6-1971-54-3907 [$O^*(^1D)$]
- $N_2O_5^* \rightarrow N_2O_4 + O$
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 [$N_2O_5^*(T_1)$]
- $N_2O_5^* \rightarrow NO_2 + NO_3$
 Tschuikow-Roux, E. JPCHAX-1969-73-3891 (calculation)
- $N_2O_5 + h\nu \rightarrow NO_2 + NO_2 + 1/2O_2$ (overall)
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 (quantum yield)
- $N_2O_5 + M \rightarrow N_2O_5^* + M$ (vibrational excitation)
 Gill and Laidler PRLAAZ-1959-250-121 (calculation)
 Tschuikow-Roux, E. JPCHAX-1969-73-3891 (calculation)
- $N_2O_5^* + M \rightarrow N_2O_5 + M$ (electronic relaxation)
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 [$N_2O_5^*(T_1)$]
- $N_2O_5^* + M \rightarrow N_2O_5^{**} + M$ (electronic transition)
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 [$S_1 \rightarrow T_1$] (mechanism)
- $N_2O_5^* + M \rightarrow NO_2 + NO_3 + M$
 Gill and Laidler PRLAAZ-1959-250-121 (calculation)
- $N_2O_5 + N_2O_5 \rightarrow 4NO_2 + O_2$ (overall)
 Bodenstein and Jost B00KA7-1941-267 (review)
- $N_2O_5 + NO \rightarrow NO_2 + NO_2 + NO_2$ (overall)
 Norrish, R. G. W. NATUAS-1927-119-123 (mechanism)
- $N_2O_5 + NO_2 + h\nu \rightarrow 3NO_2 + 1/2O_2$ (overall)
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 (quantum yield)
- $N_2O_5 + O \rightarrow N_2O_4 + O_2$
 Murphy, R. H. PHDTAG-1969-Calif. Univ., L.A.
 (upper limit estimate)
- $N_2O_5 + O^* \rightarrow$
 Wayne, R. P. PHCBAP-1966-5-889 [$O^*(^1D)$]

$\text{N}\Theta^* \rightarrow \text{N} + \Theta$

Bubert, H.
Callear and Pilling
Callear and Pilling

JCPA6-1972-56-1113 [$\text{D}^2\Sigma^+$, $v = j$]
TFS0A4-1970-66-1618 [$\text{C}^2\Pi$]
TFS0A4-1970-66-1886 [$\text{D}^2\Sigma^+$, or $\text{C}^2\Pi$]

$\text{N}\Theta^* \rightarrow \text{N}\Theta + h\nu$

Bortner, et al.
Broemer and Zwirner
Bubert, H.

*GESLZ6-1970-RPT/DASA-2560 (review)
ZENAAU-1969-24-118 [$\text{N}\Theta^*(\text{B}^2\Pi_r)$]

JCPA6-1972-56-1113 [$\text{N}\Theta^*(\text{D}^2\Sigma^+$
 $v = j) \rightarrow [\text{N}\Theta^*(\text{X}_2\Pi_r, v = n)$

Callear and Pilling
Callear and Pilling
Copeland, G. E.

TFS0A4-1970-66-1618 [$\text{N}\Theta^*(\text{C}^2\Pi)$]
TFS0A4-1970-66-1886 [$\text{N}\Theta^*(\text{D}^2\Pi$ or $\text{C}^2\Pi)$]
JCPA6-1972-56-689 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$

$v = 0, 1, 2]$

Copeland, et al.

BAPSA6-1970-15-429 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$
 $v = 0, 1, 2]$

Crosley and Zare

JCPA6-1968-49-4231 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$
 $v = 1]$

Fontijn and Ellison

JPCHAX-1968-72-3701 [$\text{N}\Theta^*(\text{A}^2\Sigma^+$,
or $\text{B}^2\Pi_r)$] (mechanism)

German, et al.

JCPA6-1971-54-4039 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$
 $v = 1]$

Hesser, J. E.

JCPA6-1968-48-2518 [$\text{N}\Theta^*(\text{D}^2\Sigma^+)$]

Hesser and Dressler

ASJ0AB-1965-142-389 [$\text{N}\Theta^*(\text{D}^2\Sigma^+)$]

Hesser and Dressler

JCPA6-1966-45-3149 [$\text{N}\Theta^*(\text{A}^1\Pi)$]

Roth, W.

JCPA6-1961-34-999 [$\text{N}\Theta^*(\text{A}^2\Sigma^+ v = m)$]
[$\text{N}\Theta(\text{X}^2\Pi_r, v = n)$]

Weinstock and Zare

JCPA6-1972-56-3456 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$
 $v = 1]$

Zelikoff and Aschenbrand

JCPA6-1957-27-123 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$]
(mechanism)

$\text{N}\Theta^{**} \rightarrow \text{N}\Theta^* + h\nu$

Bubert, H.

JCPA6-1972-56-1113 [$\text{D}^2\Sigma^+$,
 $v = j \rightarrow \text{A}^2\Sigma^+, v = j]$

Callear and Pilling

TFS0A4-1970-66-1618 [$\text{C}^2\Pi \rightarrow \text{A}^2\Sigma^+$]

Callear and Pilling

TFS0A4-1970-66-1886 [$\text{D}^2\Sigma^+$, or
 $\text{C}^2\Pi \rightarrow \text{A}^2\Sigma^+$]

Gross and Cohen

JCPA6-1968-48-2582 [$\text{C}^2\Pi \rightarrow \text{A}^2\Sigma^+$]
(evaluation)

$\text{N}\Theta + \text{M} \rightarrow \text{N}\Theta^* + \text{M}$ (vibrational excitation)

Bortner, et al.
Taylor, et al.

*GESLZ6-1970-RPT/DASA-2560 (review)
SYMCAQ-1967-11-49

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta^* + \text{M}$ (energy transfer)

Bortner, et al.	*GESLZ6-1970-RPT/DASA-2560 (review)
Callear and Wood	TFS0A4-1971-67-272 [$\text{N}\Theta^*(\text{A}^2\Sigma)$ $v = 0, 1, 2$]
Fontijn and Ellison	JPCHAX-1968-72-3701 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$; $\text{M}^* = \text{N}_2^*(\text{A}^3\Sigma_u^+)$] (mechanism)
Melton and Klemperer	JCPA6-1971-55-1468 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$ $v = 0, 1$]
Moore, C. B.	ACHRAY-1969-2-103 (review)
Taylor, et al.	SYMCAQ-1967-11-49
Young and St. John	ADCSAJ-1969-80-105 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$, $v = 0, 1$; $\text{M}^* = \text{N}_2^*(\text{A}^3\Sigma_u^+)$, $v = 0, 1$]

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta + \text{M}$ (electronic relaxation)

Bauer and Sahm	JCPA6-1965-42-3400
Callear, A. B.	DFS0AW-1962-33-28 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$ $v = 0 \rightarrow$ $\text{X}^2\Pi_r$, $v = 1$]
Callear and Pilling	TFS0A4-1970-66-1618 [$\text{N}\Theta^*(\text{C}^2\Pi)$ $v = 0$]
Callear and Pilling	TFS0A4-1970-66-1886 [$\text{N}\Theta^*(\text{C}^2\Pi)$]
Callear, et al.	TFS0A4-1968-64-2296 [$\text{N}\Theta^*(\text{D}^2\Sigma^+)$]
Copeland, G. E.	JCPA6-1972-56-689 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$, $v = 0, 1, 2$]
Heicklen, J.	JPCHAX-1966-70-2456 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$]
Kneser, et al.	JASMAN-1967-41-1029

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta + \text{M}$ (rotational relaxation)

Bauer and Sahm	JCPA6-1965-42-3400
Kneser, et al.	JASMAN-1967-41-1029

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta + \text{M}$ (vibrational relaxation)

Bauer and Sahm	JCPA6-1965-42-3400
Bauer, et al.	ACUSAY-1959-9-181
Bauer, et al.	JCPA6-1959-30-1119
Bender, D.	ANPYA2-1940-38-199
Billingsley and Callear	NATUAS-1969-221-1136
Billingsley and Callear	NATUAS-1969-224-687
Billingsley and Callear	TFS0A4-1971-67-257
Bortner, et al.	*GESLZ6-1970-RPT/DASA-2560 (review)
Bradley and Lewis	JCPA6-1969-50-544
Breshears and Bird	NATUAS-1969-224-268
Callear, A. B.	DFS0AW-1962-33-28
Herzfeld and Litovitz	PAPHAP-1959-7-245 (review)
Hochanadel, et al.	JCPA6-1969-50-3075
Kneser, H. O.	ANPYA2-1941-39-261
Kneser, et al.	JASMAN-1967-41-1029
Nikitin, E. E.	OPSUA3-1960-9-8
Roth, W.	JCPA6-1961-34-999
Roth, W.	JCPA6-1961-34-2204
Taylor, et al.	SYMCAQ-1967-11-49
Van Itterbeek and Thys	PHYSAG-1938-5-640

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta + \text{M}^*$ (energy transfer)

Billingsley and Callear	NATUAS-1969-224-687
Billingsley and Callear	TFS0A4-1971-67-257

$\text{N}\Theta^* + \text{M} \rightarrow \text{N}\Theta + \text{M}^*$ (energy transfer) (Continued)

Bortner, et al.	*GESLZ6-1970-RPT/DASA-2560 (review)
Callear, A. B.	DFSAW-1962-33-28
Callear and Williams	TFSOA4-1966-62-2030
Callear and Wood	TFSOA4-1971-67-598 [$\text{C}^2\Pi$]
Melton and Klemperer	JCPA6-1971-55-1468 [$\text{N}\Theta^*(\text{A}^2\Sigma^+, v=0,1)$]
Moore, C. B.	ACHRAY-1969-2-103 (review)
Taylor, et al.	SYMCAQ-1967-11-49

$\text{N}\Theta^{**} + \text{M} \rightarrow \text{N}\Theta^* + \text{M}$ (electronic transition)

Callear and Pilling	TFSOA4-1970-66-1886 [$\text{D}^2\Sigma^+ \rightarrow \text{C}^2\Pi$]
Gross and Cohen	JCPA6-1968-48-2582 [$\text{C}^2\Pi \rightarrow \text{A}^2\Sigma^+$] (evaluation)

$\text{N}\Theta^{**} + \text{M} \rightarrow \text{N}\Theta^* + \text{M}^*$ (vibration-vibration resonant exchange)

Hochanadel, et al.	JCPA6-1969-50-3075
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$\text{N}\Theta + \text{N}\Theta \rightarrow \text{N} + \text{N}\Theta_2$

Schofield, K.	PLSSAE-1965-15-643
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$\text{N}\Theta + \text{N}\Theta \rightarrow \text{N}_2 + \Theta_2$

Mahenc, et al.	CHDCAQ-1969-269-665
Schofield, K.	PLSSAE-1965-15-643

$\text{N}\Theta + \text{N}\Theta^* \rightarrow \text{N}_2 + \Theta_2$

Heicklen, J.	JPCHAX-1966-70-2456 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$]
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$\text{N}\Theta + \text{N}\Theta \rightarrow \text{N}_2\Theta + \Theta$

Schofield, K.	PLSSAE-1965-15-643
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$\text{N}\Theta + \text{N}\Theta^* \rightarrow \text{N}_2\Theta + \Theta$

Heicklen, J.	JPCHAX-1966-70-2456 [$\text{N}\Theta^*(\text{A}^2\Sigma^+)$]
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$\text{N}\Theta + \text{N}\Theta + \Theta_2 \rightarrow \text{N}\Theta_2 + \text{N}\Theta_2$

Mahenc, et al.	BSCFAS-1971-1578
Schofield, K.	PLSSAE-1965-15-643

$\text{N}\Theta + \text{N}\Theta_2 \rightarrow \text{N}_2\Theta_3$

Hochanadel, et al.	JCPA6-1969-50-3075
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$\text{N}\Theta + \text{N}\Theta_2 \rightarrow \text{N}\Theta + \text{N}\Theta_2$ (exchange)

Sharma, et al.	JPCHAX-1970-74-923
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$\text{N}\Theta + \text{N}\Theta_3 \rightarrow \text{N}\Theta_2 + \text{N}\Theta_2$

Schofield, K.	PLSSAE-1965-15-643
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$\text{N}\Theta + \Theta \rightarrow \text{N}\Theta_2 + h\nu$

Vanpee, et al.	AIAJAH-1971-9-135
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$\text{N}\theta + \theta + \text{M} \rightarrow \text{N}\theta_2 + \text{M}$	
Broemer and Zwirner Clyne, et al. Hochanadel, et al. Stuhl and Niki	ZENAAU-1969-24-118 TFSOA4-1965-61-2701 (erratum) JCPSA6-1969-50-3075 JCPSA6-1971-55-3943
$\text{N}\theta + \theta + \text{M} \rightarrow \text{N}\theta_2 + \text{M}^*$	
Schofield, K.	PLSSAE-1965-15-643
$\text{N}\theta + \theta_3 \rightarrow \text{N}\theta_2 + \theta_2$	
Johnston, H. S. Sharma, et al. Stephens, E. R.	SCIEAS-1971-173-517 (review) JPCHAX-1970-74-923 24ZVAA-1971-45 (evaluation)
$\text{N}\theta + \theta_3 \rightarrow \text{N}\theta_2^* + \theta_2$	
Redpath and Menzinger Schofield, K.	CJCHAG-1971-49-3063 PLSSAE-1965-15-643
$\text{N}\theta_2^* \rightarrow \text{N} + \theta_2$	
Bunker, D. L.	JCPSA6-1964-40-1946 (calculation)
$\text{N}\theta_2^* \rightarrow \text{N}\theta_2 + h\nu$	
Sackett and Yardley Schwartz, S. E. Sidebottom, et al.	CHPLBC-1971-9-612 [$\text{N}\theta_2^*(^2\text{B}_1)$] DABBBA-1969-30-1073 [$\text{N}\theta_2^*(^2\text{B}_1)$] CHPLBC-1972-13-337 [$\text{N}\theta_2^*(^2\text{B}_1)$]
$\text{N}\theta_2 + h\nu \rightarrow \text{N}\theta + \theta$	
Dimitriades and Whisman Hippler and Troe Johnston, H. S. Murphy, R. H. Paraskevopoulos, et al.	24ZVAA-1971-89 BBPCAX-1971-75-27 (quantum yield) SCIEAS-1971-173-517 (review) PHDTAG-1969-Calif. Univ., L.A. (quantum yield) JCPSA6-1971-54-3907 (quantum yield)
$\text{N}\theta_2 + h\nu \rightarrow \text{N}\theta + \theta^*$	
Paraskevopoulos, et al.	JCPSA6-1971-54-3907 [$\theta^*(^1\text{D})$] (quantum yield)
$\text{N}\theta_2 + h\nu \rightarrow \text{N}\theta + 1/2\theta_2$ (overall)	
Murphy, R. H. Norrish, R. G. W.	PHDTAG-1969-Calif. Univ., L.A. (quantum yield) NATUAS-1927-119-123 (mechanism)
$\text{N}\theta_2 + \text{M} \rightarrow \text{N}\theta + \theta + \text{M}$	
Keck and Kalelkar	*AVEVZJ-1968-RPT/289 (calculation)



O'Brien and Myers

CHPLBC-1971-9-544 [$\text{M}^* = \text{O}_2^*(^1\Delta_g, \text{ or } ^1\Sigma_g^+)$]



Sidebottom, et al.

CHPLBC-1972-13-337 [$\text{NO}_2^*(^2\text{B}_1)$]



Bunker, D. L.

JCPA6-1964-40-1946 (calculation)



O'Brien and Myers

CHPLBC-1971-9-544 [$\text{M}^* = \text{O}_2^*(^1\Delta_g, \text{ or } ^1\Sigma_g^+)$]

Schwartz, S. E.

DABBBA-1969-30-1073 [$\text{NO}_2^*(^2\text{B}_1)$]



Mahenc, et al.

CHDCAQ-1969-269-665



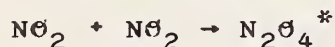
Schofield, K.

PLSSAE-1965-15-643



Sharma, et al.

JPCHAX-1970-74-923



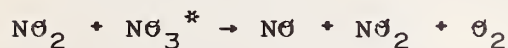
Sharma, et al.

JPCHAX-1970-74-923



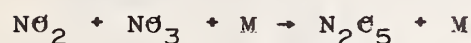
Sharma, et al.

JPCHAX-1970-74-923



Murphy, R. H.

PHDTAG-1969-Calif. Univ., L.A.



Bodenstein and Jost

B00KA7-1941-267 (review)



Cupitt and Glass
Hippler and Troe
Johnston, H. S.
Stephens, E. R.

TFS0A4-1971-67-1
BBPCAX-1971-75-27
SCIEAS-1971-173-517 (review)
24ZVAA-1971-45 (evaluation)

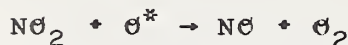


Pitts, et al.

ESTHAG-1969-3-241 [$\text{O}_2^*(^1\Delta_g)$]

Schofield, K.

PLSSAE-1965-15-643 [$v \leq 9$] (review)



Paraskevopoulos, et al. JCPA6-1971-54-3907 [$\text{O}^*(^1D)$]



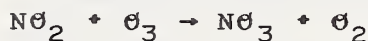
Hippler and Troe

BBPCAX-1971-75-27



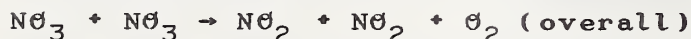
Schofield, K.

PLSSAE-1965-15-643



Bodenstein and Jost
Schofield, K.

BOOKA7-1941-267 (review)
PLSSAE-1965-15-643



Bodenstein and Jost

BOOKA7-1941-267 (review)



Murphy, R. H.

I(b). PHDTAG-1969-Calif. Univ., L.A.
REVIEWS

Bodenstein and Jost

BOOKA7-1941-267

Cottrell and McCoubrey

BOOKA7-1961 (N_2 , N_2O rot. and
vib. relax.; pgs. 80, 81, 93)

Donovan and Husain

CHREAY-1970-70-489 (N^*)

Gilmore, et al.

JQSRAE-1969-9-157 (N , N_2 , NO
excitation and relaxation)

Herzfeld and Litovitz

PAPHAP-1959-7 (N_2 , N_2O , NO, rot.
and vibr. relax.:
pgs. 238, 241, 245, 252)

Johnston, H. S.

SCIEAS-1971-173-517 (Nitrogen oxides)

Kneser, H. O.

EENAA3-1949-22-121 (N_2 , N_2O

vibrational relaxation)

Kondratiev, V. N.

BOOKA7-1970 (N , N_2 , Nitrogen

oxides: General Tables)

McCoubrey, et al.

TFSOA4-1961-57-1472 (N_2 , N_2O

vibrational relaxation)

Moore, C. B.

ACHRAY-1969-2-103 (N_2 , N_2O , NO

vibrational energy transfer)

Schiff, H. J.

CJCHAG-1969-47-1903

Taylor and Bitterman

RMPHAT-1969-41-26 (N_2 vibrational
energy transfer)

II(a). REACTIONS INVOLVING Θ SPECIES

- $\Theta^*(^1D) \rightarrow \Theta(^3P) + h\nu$
 Bortner and Kummler *GESLZ6-1969-RPT/GE-9500-ECS-SR-1
 (review)
 Dalgarno and Walker JAHSK-1964-21-463
 Young and Ung JCPSA6-1966-44-3038
- $\Theta^*(^1S) \rightarrow \Theta(^3P) + h\nu$
 Bortner and Kummler *GESLZ6-1969-RPT/GE-9500-ECS-SR-1
 (review)
 Evans and Vallance-Jones CJPHAD-1965-43-697
 Omholt and Harang JATPA3-1955-7-247
- $\Theta^*(^3S^0) \rightarrow \Theta(^3P) + h\nu$
 Ajello, J. M. JCPSA6-1971-55-3156
- $\Theta^*(^5S^0) \rightarrow \Theta(^3P) + h\nu$
 Ajello, J. M. JCPSA6-1971-55-3156
- $\Theta^{**}(^1S) \rightarrow \Theta^*(^1D) + h\nu$
 Fontijn and Ellison JPCHAX-1968-72-3701 (mechanism)
- $\Theta(^3P) + M^* \rightarrow \Theta^*(^1D) + M$ (electronic energy transfer)
 $M^* = \Theta_2^*(b^1\Sigma_g^+, v = 2)$
 Wallace and Chamberlain PLSSAE-1959-2-60 (calculation)
- $\Theta(^3P) + M^* \rightarrow \Theta^*(^1S) + M$ (electronic energy transfer)
 $M^* = N_2^*(A^3\Sigma_u^+)$
 Fontijn and Ellison JPCHAX-1968-72-3701 (mechanism)
 Meyer, et al. ASJØAB-1969-157-1023
 Meyer, et al. JPCHAX-1970-74-2238
 Parkinson and Zipf PLSSAE-1970-18-895
- $\Theta^*(^1D) + M \rightarrow \Theta(^3P) + M$ (electronic relaxation)
 Bates and Dalgarno JATPA3-1953-4-112 (estimate)
 Biedenkapp, et al. CHPLBC-1970-5-379
 Bortner and Kummler *GESLZ6-1969-RPT/GE-9500-ECS-SR-1
 (review)
 Castellano and Schumacher ZPCFAX-1971-76-258
 Clerc and Barat JCPOAY-1966-63-1525
 Clerc and Barat JCPSA6-1967-46-107 (estimation)
 Dalgarno and Walker JAHSK-1964-21-463
 DeMore, W. B. JCPSA6-1967-47-2777
 DeMore and Dede JPCHAX-1970-74-2621
 DeMore and Raper JCPSA6-1962-37-2048
 DeMore and Raper JCPSA6-1966-44-1780
 DeMore and Raper JCPSA6-1967-46-2500
 Dodge and Heicklen IJCKBØ-1971-3-269
 Donovan and Husain CHREAY-1970-70-489 (review)
 Donovan, et al. TFSØA4-1970-66-774 (calculation)
 Donovan, et al. TFSØA4-1971-67-375
 Gauthier and Snelling JCPSA6-1971-54-4317
 Gilpin, et al. JCPSA6-1971-55-1087
 Greenberg and Heicklen IJCKBØ-1970-2-185

$\Theta^*(^1D) + M \rightarrow \Theta(^3P) + M$ (electronic relaxation) (Continued)

Greenberg and Heicklen	IJCKB0-1972-4-417
Gulledge, et al.	JGREAS-1968-73-5535
Hunten and McElroy	RVGPA3-1966-4-303 (review)
LeBlanc, et al.	JCPSA6-1966-45-2200
Lowenstein, M.	JCPSA6-1971-54-2282
Norrish and Wayne	PRLAAZ-1965-288-361 (mechanism)
Paraskevopoulos and Cveticanovic	JACSAT-1969-91-7572
Paraskevopoulos, et al.	JCPSA6-1971-54-3907
Pravilov and Vilesov	RJPCAR-1971-45-1018
Preston and Cveticanovic	JCPSA6-1966-45-2888
Quick and Cveticanovic	CJCHAG-1971-49-2193
Raper and DeMore	JCPSA6-1964-40-1053 (mechanism)
Scott, et al.	CJCHAG-1971-49-1808
Seaton, M. J.	JTEPAR-1955-5-289
Slinger and Black	JCPSA6-1971-54-1889
Snelling and Bair	JCPSA6-1968-48-5737 (upper limit estimate)
Sullivan and Warneck	JCPSA6-1967-46-953
Vilesov and Pravilov	HIECAP-1970-4-191
Vilesov and Pravilov	HIECAP-1970-4-475
von Ellenrieder, et al.	CHPLBC-1971-9-152
von Ellenrieder, et al.	ZPCFAX-1971-76-240
Wallace and Hunten	JGREAS-1968-73-4813
Wallace and McElroy	PLSSAE-1966-14-677
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Welge, et al.	BBPCAX-1969-73-911
Yamazaki and Cveticanovic	JCPSA6-1964-41-3703
Young and Ung	JCPSA6-1966-44-3038

$\Theta^*(^1S) + M \rightarrow \Theta(^3P) + M$ (electronic relaxation)

Barth and Hildebrandt	JGREAS-1961-66-985
Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Evans and Vallance Jones	CJPHAD-1965-43-697
Hunten and McElroy	RVGPA3-1966-4-303 (review)
LeBlanc, et al.	JCPSA6-1966-45-2200
Omholt and Harang	JATPA3-1955-7-247
Wallace and McElroy	PLSSAE-1966-14-677
Welge, et al.	BBPCAX-1969-73-911
Welge, et al.	CHPLBC-1971-10-13
Young and Black	PLSSAE-1966-14-113

$\Theta^*(^1D) + M \rightarrow \Theta(^3P) + M^*$ (electronic energy transfer)

$M^* = \Theta_2^*(a^1\Delta_g)$	
Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Gauthier and Snelling	JCPSA6-1971-54-4317
Gilpin, et al.	JCPSA6-1971-55-1087
Langley and McGrath	PLSSAE-1971-19-416
McCullough and McGrath	CHPLBC-1971-8-353
Seaton, M. J.	ASJ0AB-1958-127-67 (calculation)
Vallance Jones and Gattinger	PLSSAE-1963-11-961 (estimate)
Vilesov and Pravilov	HIECAP-1970-4-191
Wayne, R. P.	ADPCA2-1969-7-311 (review)
$M^* = \Theta_2^*(b^1\Sigma_g^+)$	
Biedenkapp and Bair	JCPSA6-1970-52-6119
Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Castellano and Schumacher	ZPCFAX-1971-76-258
Gauthier and Snelling	ANYAA9-1970-171-220 (mechanism)

$\Theta^*(^1D) + M \rightarrow \Theta(^3P) + M^*$ (electronic energy transfer) (Continued)

Gauthier and Snelling	JCPSA6-1971-54-4317
Gilpin, et al.	JCPSA6-1971-55-1087
Langley and McGrath	PLSSAE-1971-19-416
McCullough and McGrath	CHPLBC-1971-8-353
McCullough and McGrath	CHPLBC-1971-12-98
Seaton, M. J.	ASJØAB-1958-127-67 (calculation)
Seaton, M. J.	JATPA3-1954-4-295 (calculation)
Snelling and Gauthier	CHPLBC-1971-9-254
von Ellenrieder, et al.	CHPLBC-1971-9-152
von Ellenrieder, et al.	ZPCFAX-1971-76-240
Wallace and Chamberlain	PLSSAE-1959-2-60 (calculation)
Wallace and Hunten	JGREAS-1968-73-4813
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Welge, et al.	BBPCAX-1969-73-911
Young and Black	JCPSA6-1967-47-2311

$\Theta^*(^1D) + M \rightarrow \Theta(^3P) + M^*$ (electronic-vibrational energy transfer)

	$M^* = N_2^*(X^1\Sigma_g^+, v > 0)$
Seaton, M. J.	ASJØAB-1958-127-67 (calculation)
	$M^* = \Theta_2^*(X^3\Sigma_g^-, v > 0)$
McCullough and McGrath	CHPLBC-1971-8-353
McCullough and McGrath	CHPLBC-1971-12-98

$\Theta^*(^1S) + M \rightarrow \Theta(^3P) + M^*$ (electronic energy transfer)

	$M^* = N_2^*(?)$
Young and Sharpless	JCPSA6-1963-39-1071 (upper limit estimate)
	$M^* = \Theta_2^*(a^1\Delta_g)$
Seaton, M. J.	JATPA3-1954-4-295 (calculation)
	$M^* = \Theta_2^*(b^1\Sigma_g^+)$
Seaton, M. J.	JATPA3-1954-4-295 (calculation)

$\Theta^*(^1S) + M \rightarrow \Theta(^3P) + M^*$ (electronic-vibrational energy transfer)

	$M^* = N_2^*(X^1\Sigma_g^+, v > 0)$
Seaton, M. J.	ASJØAB-1958-127-67 (calculation)

$\Theta^{**}(^1S) + M \rightarrow \Theta^*(^1D) + M$ (electronic transition)

Barth and Hildebrandt	JGREAS-1961-66-985
Bortner and Kummier	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
LeBlanc, et al.	JCPSA6-1966-45-2200
Young and Black	PLSSAE-1966-14-113
Young, et al.	JCPSA6-1968-49-4769

$\Theta^{**}(^1S) + M \rightarrow \Theta^*(^1D) + M^*$ (electronic energy transfer)

	$M^* = N_2^*(?)$
Young and Sharpless	JCPSA6-1963-39-1071 (upper limit estimate)
	$M^* = \Theta^*(^1D)$
Young and Sharpless	JCPSA6-1963-39-1071

$\Theta^{**}(^1S) + M \rightarrow \Theta^{*}(^1D) + M^{*}$ (electronic energy transfer) (Continued)

$$M^{*} = \Theta_2^{*}(a^1\Delta_g)$$

Seaton, M. J. JATPA3-1954-4-295 (calculation)

$$M^{*} = \Theta_2^{*}(b^1\Sigma_g^{+})$$

Seaton, M. J. JATPA3-1954-4-295 (calculation)

$\Theta^{**}(^1S) + \Theta(^3P) \rightarrow \Theta^{*}(^1D) + \Theta^{*}(^1D)$ (electronic energy transfer)

Young and Sharpless JCPSA6-1963-39-1071

$\Theta + \Theta \rightarrow \Theta_2 + h\nu$

Bates and Dalgarno JATPA3-1953-4-112 (calculation)

$\Theta + \Theta + M \rightarrow \Theta_2 + M$

Billotte, et al.
Broemer and Zwirner
Jensen and Jones
Shui, et al.

ENTPA5-1971-38-5
ZENAAU-1969-24-118
*RPREZ8-1971-RPT/71-9 (review)
SYMCAQ-1971-13-21 (calculation)

$\Theta + \Theta + M \rightarrow \Theta_2 + M^{*}$

$M^{*} = \text{Ar}^{*}, \text{C}\Theta_2^{*}, \text{He}^{*}, \text{Kr}^{*}, \text{N}_2^{*}, \text{N}_2\Theta^{*}, \Theta^{*}, \Theta_2^{*}, \text{SF}_6^{*}, \text{Xe}^{*}$

Schofield, K. FLSSAE-1965-15-643 (evaluation)

$$M^{*} = \text{CN}^{*}$$

Setser and Thrush PRLAAZ-1965-288-275

$$M^{*} = \text{Na}^{*}$$

Carabetta and Kaskan SYMCAQ-1967-11-321

$$M^{*} = \Theta^{*}(^1S)$$

Schofield, K. PLSSAE-1965-15-643 (evaluation)
Young and Black PLSSAE-1966-14-113

$\Theta(^3P) + \Theta(^3P) + M \rightarrow \Theta_2^{*}(a^1\Delta_g) + M$

Wayne, R. P. ANYAA9-1970-171-199

$\Theta(^3P) + \Theta(^3P) + M \rightarrow \Theta_2^{*}(b^1\Sigma_g^{+}) + M$

Pitts, et al. ESTHAG-1969-3-241 (review)
Wayne, R. P. ADPCA2-1969-7-311 (review)

$\Theta(^3P) + \Theta(^3P) + M \rightarrow \Theta_2^{*}(A^3\Sigma_u^{+}) + M$

McNeal and Durana JCPSA6-1969-51-2955 (mechanism)

$\Theta(^3P) + \Theta(^3P) + M \rightarrow \Theta_2^{*}(B^3\Sigma_u^{-}) + M$

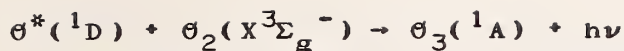
Myers and Bartle JCPSA6-1967-47-1783

$\Theta + \Theta + M \rightarrow \Theta_2 + M + h\nu$ (overall)

Myers and Bartle JCPSA6-1968-48-3935

$\Theta + \Theta_2 \rightarrow \Theta + \Theta_2$ (exchange)

Garnett, et al. JCPSA6-1969-51-84



Seaton, M. J.

JATPA3-1954-4-295 (upper limit estimate)



Bodenstein and Jost
Dimitriadis and Whisman
Francis, P. D.
Hippler and Troe
Stephens, E. R.
Stuhl and Niki
Vilesov and Pravilov
Vilesov and Pravilov
Wood and Heicklen

B00KA7-1941-267 (review)
24ZVAA-1971-89
BJAPAJ-1969-2-1717
BBPCAX-1971-75-27
24ZVAA-1971-45 (evaluation)
JCPSA6-1971-55-3943
HIECAP-1970-4-359
HIECAP-1970-4-475
JPCHAX-1971-75-861



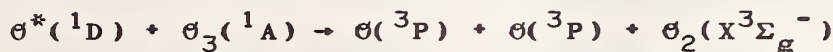
Schofield, K.

PLSSAE-1965-15-643 (evaluation)



Vilesov and Pravilov

HIECAP-1970-4-475



Baiamonte, et al.

JCPSA6-1971-55-3617



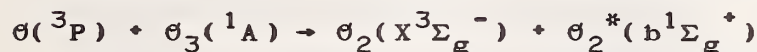
Bodenstein and Jost
Johnston, H. S.
Kondratiev and Interzarova
Krenzski, et al.
McCrum and Kaufman
Michael, J. V.

B00KA7-1941-267 (review)
SCIEAS-1971-173-517 (review)
IJCKB0-1969-1-105
IJCKB0-1971-3-467
JCPSA6-1972 (in press)
JCPSA6-1971-54-4455



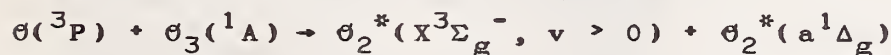
Ellis, et al.

NATUAS-1971-229-153 (mechanism)



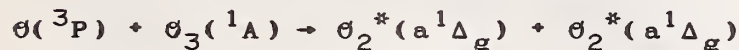
Pitts, et al.
Young and Black

ESTHAG-1969-3-241 (review)
JCPSA6-1966-44-3741

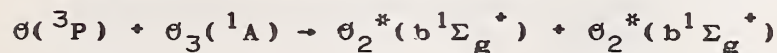


Schofield, K.

PLSSAE-1965-15-643 (evaluation)

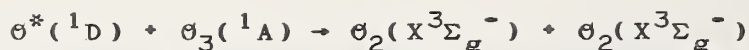


Vallance Jones and Harrison JATPA3-1958-13-45 (mechanism)

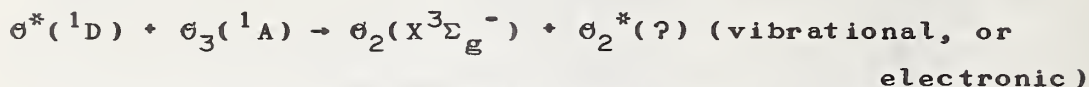


Heidt, L. J.

JACSAT-1935-57-1710



Biedenkapp, et al.	CHPLBC-1970-5-379
DeMore and Raper	JCPSA6-1966-44-1780
Gauthier and Snelling	JCPSA6-1971-54-4317
Goldman, et al.	IJCKB-1971-3-501
Langley and McGrath	PLSSAE-1971-19-413
Langley and McGrath	PLSSAE-1971-19-416
Wayne, R. P.	ADPCA2-1969-7-311 (review)



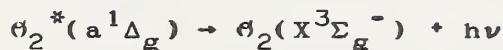
Castellano and Schumacher	ZPCFAX-1971-76-258
Ellis, et al.	NATUAS-1971-229-153 (mechanism)
McCullough and McGrath	CHPLBC-1971-12-98
Norrish and Wayne	PRLAAZ-1965-288-200 (mechanism)
Schofield, K.	PLSSAE-1965-15-643 (evaluation)
von Ellenrieder, et al.	CHPLBC-1971-9-152
von Ellenrieder, et al.	ZPCFAX-1971-76-240
Wayne, R. P.	PHCBAP-1966-5-889



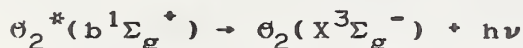
Baiamonte, et al.	JCPSA6-1971-55-3617
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Pitts, et al.	ESTHAG-1969-3-241 (review)
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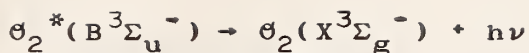
Akimoto and Pitts	JCPSA6-1970-53-1312 (mechanism)
Badger, et al.	JCPSA6-1965-43-4345
Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Noxon, J. F.	CJPHAD-1969-39-1110
Vallance Jones and Gattinger	PLSSAE-1963-11-961 (calculation)
Vallance Jones and Harrison	JATPA3-1958-13-45
Wayne, R. P.	ADPCA2-1969-7-311 (review)



Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Childs, W. H. J.	PHMSAO-1932-14-1049
Childs and Mecke	ZEPYAA-1931-68-344
Noxon, J. F.	CJPHAD-1961-39-1110
Seaton, M. J.	ASJ-1958-127-67 (calculation)
Wallace and Chamberlain	PLSSAE-1959-2-60 (v = 2) (calculation)
Wark and Mercer	AP-1965-4-839
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Young and Black	JCPSA6-1966-44-3741



McNeal and Durana	JCPSA6-1969-51-2955 (mechanism)
Young and Black	JCPSA6-1966-44-3741



Myers and Bartle
Myers and Bartle

JCPSA6-1967-47-1783
JCPSA6-1968-48-3935



Bortner and Kummler

*GESLZ6-1969-RPT/GE-9500-ECS-SR-1
(review)

Noxon, J. F.
Seaton, M. J.

CJPHAD-1961-39-1110
ASJØAB-1958-127-67 (calculation)



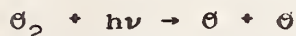
Broadbent, et al.
Coomber and Pitts
Furukawa, et al.
Gleason, et al.
Herron and Huie
Herron and Huie
Kearns, D. R.
Khan, et al.
Kummler and Bortner
Pitts, J. N., Jr.
Pitts, J. N., Jr.
Pitts, et al.
Steer, et al.

CCØMA8-1968-1315 (mechanism)
ESTHAG-1970-4-506
ANYAA9-1970-171-175
JACSAT-1970-92-2068
ANYAA9-1970-171-229
JCPSA6-1969-51-4164
CHREAY-1971-71-395 (review)
ESTHAG-1967-1-656 (mechanism)
ANYAA9-1970-171-273 (review)
ANYAA9-1970-171-239 (review)
24ZVAA-1971-3 (review)
ESTHAG-1969-3-241 (review)
ESTHAG-1969-3-946 (mechanism)



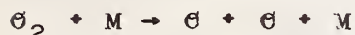
Kearns, D. R.
Khan, et al.
Pitts, et al.

CHREAY-1971-71-395 (review)
ESTHAG-1967-1-656 (mechanism)
ESTHAG-1969-3-241 (review)



Johnston, H. S.

SCIEAS-1971-173-517 (review)



Billotte, et al.
Breshears and Bird
Keck, J.

ENTPA5-1971-38-5
JCPSA6-1971-55-4017
DFSØAW-1962-33-173 (calculation)



Myers and Bartle

JCPSA6-1967-47-1783



Clouston, et al.

PRLAAZ-1958-248-429



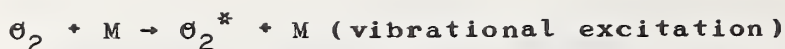
Walker, J. C. G.

PLSSAE-1970-18-1043 (mechanism)



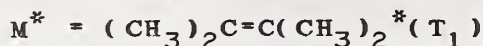
Myers and Bartle

JCPSA6-1968-48-3935



Myers and Bartle

JCPSA6-1968-48-3935

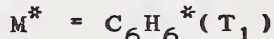


Coomber and Pitts ESTHAG-1970-4-506 (mechanism)



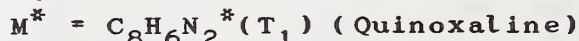
Coomber and Pitts ESTHAG-1970-4-506 (mechanism)

Kummler and Bortner ESTHAG-1969-3-944 (mechanism)



Snelling, D. R. CHPLBC-1968-2-346

Steer, et al. ESTHAG-1969-3-946 (mechanism)



Duncan and Kearns CHPLBC-1971-12-306



Duncan and Kearns CHPLBC-1971-12-306

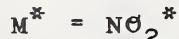
Kearns, et al. JACSAT-1969-91-1039

Steer, et al. ESTHAG-1969-3-946 (mechanism)

Wasserman, et al. JACSAT-1969-91-1040



Wallace and McElroy PLSSAE-1966-14-677



O'Brien and Myers CHPLBC-1971-9-544 (mechanism)



Bortner and Kummler *GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)

Gauthier and Snelling JCPSA6-1971-54-4317

Gilpin, et al. JCPSA6-1971-55-1087

Langley and McGrath PLSSAE-1971-19-416

McCullough and McGrath CHPLBC-1971-8-353

Seaton, M. J. JATPA3-1954-4-295 (calculation)

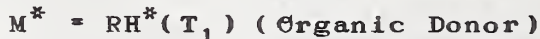
Seaton, M. J. ASJGAB-1958-127-67 (calculation)

Vallance Jones and Gattinger PLSSAE-1963-11-961 (estimate)

Vilesov and Pravilov HIECAP-1970-4-191



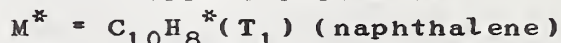
Seaton, M. J. JATPA3-1954-4-295 (calculation)



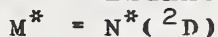
Khan, et al. ESTHAG-1967-1-656 (mechanism)



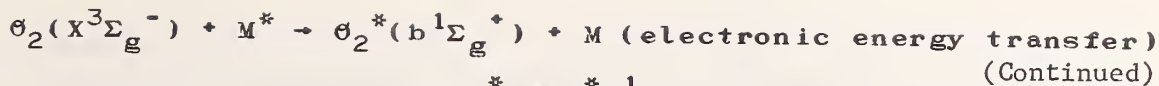
Snelling, D. R. CHPLBC-1968-2-346



Khan, et al. ESTHAG-1967-1-656 (mechanism)



Wallace and McElroy PLSSAE-1966-14-677



$$M^* = \Theta^*(^1D)$$

Biedenkapp and Bair JCPA6-1970-52-6119
 Bortner and Kummeler *GESLZ6-1969-RPT/GE-9500-ECS-SR-1
 (review)

Castellano and Schumacher ZPCFAX-1971-76-258
 Gauthier and Snelling ANYAA9-1970-171-220 (mechanism)
 Gauthier and Snelling JCPA6-1971-54-4317
 Gilpin, et al. JCPA6-1971-55-1087
 Langley and McGrath PLSSAE-1971-19-416
 McCullough and McGrath CHPLBC-1971-8-353
 McCullough and McGrath CHPLBC-1971-12-98
 Seaton, M. J. JATPA3-1954-4-295 (calculation)
 Seaton, M. J. ASJØAB-1958-127-67 (calculation)
 Snelling and Gauthier CHPLBC-1971-9-254
 Vilesov and Pravilov HIECAP-1970-4-191
 von Ellenrieder, et al. CHPLBC-1971-9-152
 von Ellenrieder, et al. ZPCFAX-1971-76-240
 Wallace and Chamberlain PLSSAE-1959-2-60 (calculation)
 Wallace and Hunten JGREA2-1968-73-4813
 Welge, et al. BBPCAX-1969-73-911
 Young and Black JCPA6-1967-47-2311

$$M^* = \Theta^*(^1S)$$

Seaton, M. J. JATPA3-1954-4-295 (calculation)



$$M^* = Hg^*(6^3P_1)$$

Heicklen and Johnston JPCHAX-1967-71-1391

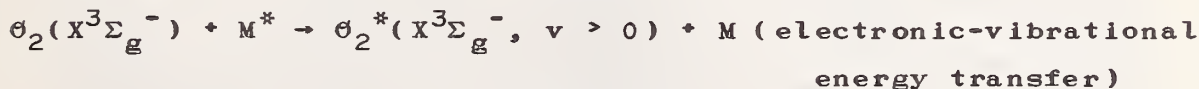


$$M^* = C\Theta_2^*(^1B_2, \text{ or } ^3B_2)$$

Myers and Bartle JCPA6-1967-47-1783

$$M^* = N_2^*(A^3\Sigma_u^+)$$

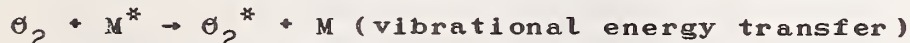
Callear and Wood TFSØA4-1971-67-272



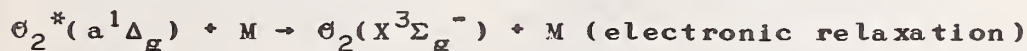
$$M^* = \Theta^*(^1D)$$

McCullough and McGrath CHPLBC-1971-12-98

McCullough and McGrath CHPLBC-1971-8-353



Bauer and Roesler ZENAAU-1964-19-656
 Breshears and Bird JCPA6-1968-48-4768
 Cottrell and Day JCPA6-1965-43-1433
 Henderson and Herzfeld JASMAN-1965-37-986 (review)
 Monk, R. G. JASMAN-1969-46-580
 Moore, C. B. ACHRAY-1969-2-103 (review)
 Taylor and Bitterman RMPHAT-1969-41-26 (review)
 White, D. R. JCPA6-1968-49-5472



Ackerman, et al. JCPA6-1970-52-1603
 Ackerman, et al. JCPA6-1971-54-4960
 Akimoto and Pitts JCPA6-1970-53-1312

$\Theta_2^*(a^1\Delta_g) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M$ (electronic relaxation) (Continued)

Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Clark and Wayne	CHPLBC-1969-3-93
Clark and Wayne	CHPLBC-1969-3-405
Clark and Wayne	PRLAAZ-1969-314-111
Duncan and Kearns	CHPLBC-1971-12-306
Evans, et al.	JGREAS-1968-73-2885 (upper limit) estimate)
Evans, et al.	PLSSAE-1969-17-933 (calculation)
Findlay and Snelling	JCPA6-1971-54-2750
Findlay and Snelling	JCPA6-1971-55-545
Findlay, et al.	CHPLBC-1969-3-204
Furukawa, et al.	ANYAA9-1970-171-175
Furukawa and Ogryzlo	CHPLBC-1971-12-370
Gleason, et al.	JACSAT-1970-92-2068
Hunten and McElroy	RVGPA3-1966-4-303 (review)
Kearns, D. R.	CHREAY-1971-71-395 (review)
Kummler and Bortner	ANYAA9-1970-171-273 (review)
Kummler and Bortner	ESTHAG-1969-3-944 (mechanism)
Ogryzlo and Tang	JACSAT-1970-92-5034
Olczyna and Heicklen	JPCAX-1970-74-4188
Pitts, J. N., Jr.	ANYAA9-1970-171-239 (review)
Pitts, J. N., Jr.	*SRUAZ-1971-3 (review)
Snelling and Gauthier	CHPLBC-1971-9-254
Steer, et al.	JCPA6-1969-51-843
Vallance Jones and Gattinger	PLSSAE-1963-11-961 (calculation)
Wayne, R. P.	ANYAA9-1970-171-199
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Winer and Bayes	JPCAX-1966-70-302
Zipf, E. C.	CJCHAG-1969-47-1863 (review)

$\Theta_2^*(b^1\Sigma_g^+) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M$ (electronic relaxation)

Andrews and Abrahamson	CHPLBC-1971-10-113
Arnold, et al.	ADCSAJ-1968-77-133
Beretta and Schumacher	ZPCBAL-1932-17-417
Biedenkapp and Bair	JCPA6-1970-52-6119
Bortner and Kummler	*GESLZ6-1969-RPT/GE-9500-ECS-SR-1 (review)
Derwent and Thrush	TFSCA4-1971-67-2036
Filseth and Welge	ANYAA9-1970-171-226
Filseth, et al.	JCPA6-1970-52-5502
Gilpin, et al.	JCPA6-1971-55-1087
Heidt, L. J.	JACSAT-1935-57-1710
Hunten and McElroy	RVGPA3-1966-4-303 (review)
Izod and Wayne	PRLAAZ-1968-308-81
Kearns, D. R.	CHREAY-1971-71-395 (review)
Myers and O'Brien	ANYAA9-1970-171-224
Noxon, J. F.	JCPA6-1970-52-1852
O'Brien and Myers	JCPA6-1970-53-3832
Ogryzlo, E. A.	CJCHAG-1969-47-1817
Stuhl and Niki	CHPLBC-1970-5-573
Stuhl and Niki	CHPLBC-1970-7-473
Stuhl and Welge	CJCHAG-1969-47-1870
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Wayne, R. P.	QJRMAM-1967-93-69 (calculation)
Welge, et al.	BBPCAAX-1969-73-911
Young and Black	JCPA6-1967-47-2311
Zipf, E. C.	CJCHAG-1969-47-1863 (review)

$\Theta_2^*(c^1\Sigma_u^-) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M$ (electronic relaxation)

Simonaitis and Heicklen	IJCKB0-1971-3-319
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$\Theta_2^*(A^3\Sigma_u^+) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M$ (electronic relaxation)

Hunten and McElroy
McNeal and Durana

RVGPA3-1969-4-303 (review)
JCPSA6-1969-51-2955

$\Theta_2^*(B^3\Sigma_u^-) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M$ (electronic relaxation)

Myers and Bartle
Myers and Bartle

JCPSA6-1967-47-1783
JCPSA6-1968-48-3935

$\Theta_2^* + M \rightarrow \Theta_2 + M$ (rotational relaxation)

Brout, R.
Connor, J. V.
Cottrell and McCoubrey
Ener, et al.
Fujii, et al.
Fujii, et al.
Greenspan, M.
Greene and Hornig
Herzfeld and Litovitz
Holmes, et al.
Kneser, H. O.
Myers and Bartle
Parbrook and Tempest
Parker, J. G.
Parker, et al.
Petrallia, S.
Sessler, G.
Sivian, L. J.
Thaler, W. J.
Winter and Hill
Wray and Freeman
Zartman, I. F.

JCPSA6-1954-22-1189 (calculation)
JASMAN-1958-30-297
B00KA7-1961-84 (review)
JASMAN-1952-24-474
JASMAN-1962-34-714
JASMAN-1963-35-961
JASMAN-1959-31-155
JCPSA6-1953-21-617
PAPHAP-1959-7-238 (review)
TFS0A4-1962-58-2342
BAPSA6-1933-8-17
JCPSA6-1968-48-3935
ACUSAY-1958-8-345
PFLDAS-1959-2-449
JASMAN-1953-25-263
NUCIAD-1955-2-241
ACUSAY-1958-8-395
JCPSA6-1936-4-427
JASMAN-1952-24-15
JASMAN-1967-42-848
JCPSA6-1964-40-2785
JASMAN-1949-21-171

$\Theta_2^* + M \rightarrow \Theta_2 + M$ (translational relaxation)

Wray and Freeman

JCPSA6-1964-40-2785

$\Theta_2^* + M \rightarrow \Theta_2 + M$ (vibrational relaxation)

Angerer and Ladenburg
Bauer and Roesler
Benson and Berend
Boyer, R. A.
Clark and Henderson
Colwell, et al.
Cottrell and McCoubrey
Curtis, R. W.
Dadaian and Pumper
Dixon, et al.
Esclangon, E.
Evans and Bazley
Grabau, M.
Griffith, et al.
Grossman, E.
Grueneisen and Merkel
Harlow and Kitching
Harris, C. M.
Harris, C. M.
Harris and Tempest
Harris and Tempest
Hebb, T. C.
Hebb, T. C.

ANPYA2-1921-66-293
ZENAAU-1964-19-656
JCPSA6-1966-44-470 (calculation)
JASMAN-1951-23-176
JASMAN-1963-35-1909
PHRVA0-1938-53-686
B00KA7-1961-82 (review)
PHRVA0-1934-46-811
CRAUAX-1938-20-539
PRLAAZ-1922-100-1
C0REAF-1919-168-165
ACUSAY-1956-6-238
JASMAN-1933-5-1
PHRVA0-1956-102-1209
ANPYA2-1932-13-681
ANPYA2-1921-66-344
JASMAN-1964-36-1100
JASMAN-1963-35-11
JASMAN-1966-40-148
JASMAN-1964-36-2390
JASMAN-1964-36-2416
PHRVA0-1905-20-89
PHRVA0-1919-14-74

$\Theta_2^* + M \rightarrow \Theta_2 + M$ (vibrational relaxation) (Continued)

Henderson and Herzfeld	JASMAN-1965-37-986 (review)
Henderson and Queen	JASMAN-1962-34-714
Henderson, et al.	JASMAN-1965-37-457
Henry, P. S. H.	PCPSA4-1932-28-249 (calculation)
Herzfeld and Litovitz	PAPHAP-1959-7-241 (review)
Herzfeld and Rice	PHRVAØ-1928-31-691 (calculation)
Hubbard, J. C.	PHRVAØ-1932-41-523
Ishii, C.	SPIPAG-1935-26-201
Jones, et al.	PPSØAU-1965-86-857 (calculation)
Kao, P. T.	ANPHAJ-1932-17-315
Keesom, et al.	PKAWAV-1931-34-988
Kinoshita and Ishii	SPIPAG-1932-19-83
Kneser, H. Ø.	BAPSA6-1933-8-17
Kneser, H. Ø.	ZTPHAU-1935-16-213 (review)
Kneser, H. Ø.	ZTPHAU-1938-19-486
Kneser, H. Ø.	ANPYA2-1939-34-665 (review)
Kneser, H. Ø.	EENAA3-1949-22-121 (review)
Knoetzel, H.	AKZTAG-1940-5-245
Knudsen, V. Ø.	JASMAN-1931-3-126
Knudsen, V. Ø.	BAPSA6-1933-8-16
Knudsen, V. Ø.	JASMAN-1935-6-199
Knudsen and Øbert	PHRVAØ-1935-47-256
Knudsen and Øbert	JASMAN-1936-7-249
Korolev, F. A.	CRAUAX-1938-20-545
Krasnoøshkin, P. E.	PHRVAØ-1944-65-190 (review)
Kukkamäki, T. J.	ANPYA2-1938-31-398
Lebedew, P.	ANPYA2-1911-35-171 (calculation)
McCoubrey, et al.	TFSOA4-1961-57-1472 (review)
Meyer and Sessler	ZEPYAA-1957-149-15
Mlodsejewski, A.	FPYKA6-1911-66-200
Mokhtar and Richardson	PRLAAZ-1945-184-117
Monk, R. G.	JASMAN-1969-46-580
Myers and Bartle	JCPSA6-1968-48-3935
Neklepajev, N.	ANPYA2-1911-35-175
Norton, G. A.	JASMAN-1935-7-16
Øberst, H.	AKZTAG-1937-2-76
Parker, J. G.	PFLDAS-1959-2-449
Parker, R. C.	PPSØAU-1937-49-95
Parker, et al.	JASMAN-1953-25-263
Pearson, E. B.	PPSØAU-1935-47-136
Pielemeier, W. H.	PHRVAØ-1929-34-1184
Pielemeier, W. H.	PHRVAØ-1930-35-1417
Pielemeier, W. H.	PHRVAØ-1930-36-1005
Pielemeier, W. H.	PHRVAØ-1931-38-1236
Pielemeier, W. H.	PHRVAØ-1937-52-244
Pielemeier, W. H.	JASMAN-1939-10-313 (review)
Pierce, G. W.	PAAAAV-1925-60-271
Pumper, E. J.	JØPYA6-1939-1-411
Reid, C. D.	PHRVAØ-1930-35-814
Reid, C. D.	PHRVAØ-1931-3-1147
Richardson, E. G.	PRLAAZ-1934-146-56
Rogers, H. H.	PHRVAØ-1934-45-208
Schilling, et al.	JASMAN-1947-19-222
Schmidtmueller, N.	AKZTAG-1938-3-115
Schnaus, U. E.	JASMAN-1965-37-1
Schweikert, G.	ANPYA2-1915-48-593
Sessler, G.	ACUSAY-1958-8-395
Shields and Lee	JASMAN-1963-35-1909
Sinness and Roseveare	JCPSA6-1936-4-427
Sivian, L. J.	JASMAN-1947-19-914
Smith and Tempest	JASMAN-1961-33-1626
Taylor and Bitterman	RMPHAT-1969-41-26 (review)
Tempest and Parbrook	ACUSAY-1957-7-354
Thiesen, M.	ANPYA2-1908-25-506

$\Theta_2^* + M \rightarrow \Theta_2 + M$ (vibrational relaxation) (Continued)

Van Itterbeek and Mariens PHYSAG-1937-4-207
 Van Itterbeek and Mariens PHYSAG-1937-4-609
 Van Itterbeek and Thys PHYSAG-1938-5-298
 Van Itterbeek and Van Paemel PHYSAG-1938-5-593
 White, D. R. JCPSA6-1968-49-5472
 Wray and Freeman JCPSA6-1964-40-2785
 Zartman, I. F. JASMAN-1949-21-171

$\Theta_2^*(a^1\Delta_g) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M^*$ (electronic energy transfer)

$$M^* = I^*(^2P_{1/2})$$

Arnold, et al. JCPSA6-1966-44-2529 (mechanism)
 Derwent, et al. CHPLBC-1970-6-115

$$M^* = N\Theta_2^*$$

O'Brien and Myers CHPLBC-1971-9-544 (mechanism)

$\Theta_2^*(b^1\Sigma^+) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M^*$ (electronic energy transfer)

$$M^* = N_2^*$$

Young and Black JCPSA6-1966-44-3741
 Young and Sharpless JGREAS-1962-67-3871

$$M^* = N\Theta_2^*$$

O'Brien and Myers CHPLBC-1971-9-544 (mechanism)

$$M^* = \Theta^*(^1D)$$

Wallace and Chamberlain PLSSAE-1959-2-60 (calculation)

$\Theta_2^*(c^1\Sigma_u^-) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M^*$ (electronic energy transfer)

$$M^* = C_3F_6^*(T_1)$$

Heicklen and Johnston JPCHAX-1967-71-1391

$$M^* = Hg^*(6^3P_1)$$

Heicklen and Johnston JPCHAX-1967-71-1391

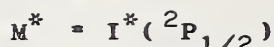
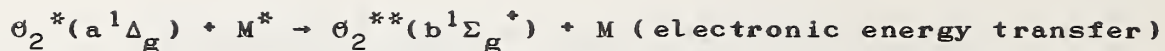
$\Theta_2^*(B^3\Sigma_u^-) + M \rightarrow \Theta_2(X^3\Sigma_g^-) + M^*$ (electronic energy transfer)

$$M^* = C\Theta_2^*(^1B_2, \text{ or } ^3B_2)$$

Myers and Bartle JCPSA6-1967-47-1783

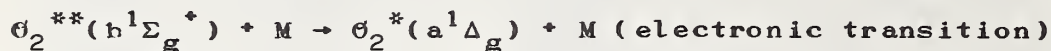
$\Theta_2^* + M \rightarrow \Theta_2 + M^*$ (vibrational energy transfer)

Bauer and Roesler ZENAAU-1964-19-656
 Calvert, J. B. JASMAN-1965-37-386 (mechanism)
 Henderson and Herzfeld JASMAN-1965-37-986 (review)
 Henderson, et al. JASMAN-1965-37-457
 Jones, et al. PPS6AU-1965-86-857 (calculation)
 Monk, R. G. JASMAN-1969-46-580
 Moore, C. B. ACHRAY-1969-2-103 (review)
 Taylor and Bitterman RMPHAT-1969-41-26 (review)
 White, D. R. JCPSA6-1968-49-5472
 Yardley and Moore JCPSA6-1968-48-14



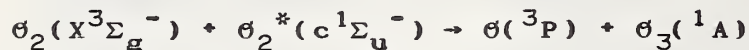
Arnold, et al.
Derwent, et al.

JCPSA6-1966-44-2529 (mechanism)
CHPLBC-1970-6-115

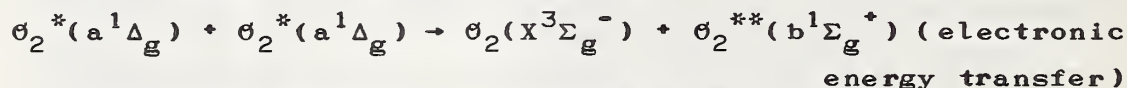


Coomber and Pitts

ESTHAG-1970-4-506 (mechanism)



Simonaitis and Heicklen IJCKB8-1971-3-319



Arnold and Ogryzlo
Arnold, et al.
Bortner and Kumler

CJPHAD-1967-45-2053
ADCSAJ-1968-77-133
*GESLZ6-1969-RPT/GE-9500-ECS-SR-1
(review)

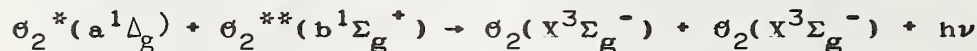
Derwent and Thrush
Izod and Wayne
March, et al.
Schofield, K.
Myers and O'Brien
Wayne, R. P.
Wayne, R. P.
Wayne, R. P.
Winer and Bayes
Young and Black

TFS8A4-1971-67-2036
PRLAAZ-1968-308-81
PHCBAP-1965-4-971 (mechanism)
PLSSAE-1967-15-643 (review)
ANYAA9-1970-171-224 (mechanism)
ADPCA2-1969-7-311 (review)
PHCBAP-1966-5-889
QJRMAM-1967-93-69 (mechanism)
JPCHAX-1966-70-302
JCPSA6-1965-42-3740



Akimoto and Pitts
Arnold, et al.
Arnold, et al.
Arnold, et al.
Bader and Ogryzlo
Derwent and Thrush
Falick and Mahan
Gray and Ogryzlo
Wayne, R. P.

JCPSA6-1970-53-1312 (mechanism)
JCPSA6-1964-40-1769 (mechanism)
PHCBAP-1965-4-963
JCPSA6-1966-44-2529 (review)
DFS8AW-1964-37-46 (mechanism)
TFS8A4-1971-67-2036
JCPSA6-1967-47-4778
CHPLBC-1969-3-658
ADPCA2-1969-7-311 (review)



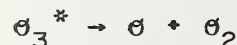
Gray and Ogryzlo

CHPLBC-1969-3-658



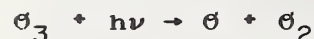
Gray and Ogryzlo

CHPLBC-1969-3-658



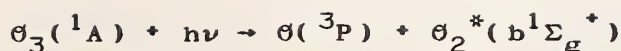
Bunker, D. L.
Gill and Laidler

JCPSA6-1964-40-1946 (calculation)
PRLAAZ-1959-250-121 (calculation)



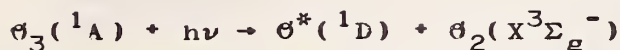
Bodenstein and Jost
Ellis, et al.
Johnston, H. S.

B88KA7-1941-267 (review)
NATUAS-1971-229-153 (mechanism)
SCIEAS-1971-173-517 (review)



Heidt, L. J.

JACSAT-1935-57-1710



Biedenkapp, et al.

CHPLBC-1970-5-379

DeMore, W. B.

JCPA6-1967-47-2777 (quantum yield)

DeMore and Dede

JPCHAX-1970-74-2621

Norrish and Wayne

PRLAAZ-1965-288-361 (quantum yield)



Castellano and Schumacher ZPCFAX-1971-76-258 (quantum yield)

Gauthier and Snelling ANYAA9-1970-171-220 (mechanism)

Gauthier and Snelling JCPA6-1971-54-4317

Gilpin, et al. JCPA6-1971-55-1087

Jones and Wayne PRLAAZ-1971-321-409 (quantum yield)

Kummler, et al. ESTHAG-1969-3-248 (calculation)

Langley and McGrath PLSSAE-1971-19-413 (quantum yield)

Langley and McGrath PLSSAE-1971-19-416

McCullough and McGrath CHPLBC-1971-12-98

Norrish and Wayne PRLAAZ-1965-288-200 (quantum yield)

Vallance Jones and Gattinger PLSSAE-1963-11-961 (mechanism)

von Ellenrieder, et al. CHPLBC-1971-9-152

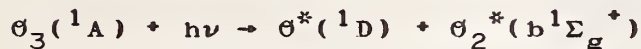
von Ellenrieder, et al. ZPCFAX-1971-76-240 (quantum yield)

Wallace and Hunten JGREA2-1968-73-4813 (mechanism)

Wayne, R. P. ADPCA2-1969-7-311 (review)

Wayne, R. P. PHCBAP-1966-5-889

Wayne, R. P. QJRMAM-1967-93-69 (mechanism)

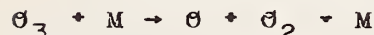


Gauthier and Snelling JCPA6-1971-54-4317

Gilpin, et al. JCPA6-1971-55-1087

Norrish and Wayne PRLAAZ-1965-288-200 (quantum yield)

Wallace and Hunten JGREA2-1968-73-4813 (mechanism)



Bunker, D. L. JCPA6-1962-37-393 (calculation)

Keck and Kalelkar *AVEVZJ-1968-RPT/289 (calculation)

Michael, J. V. JCPA6-1971-54-4455



$M^* = C\Theta^*, C\Theta_2^*, C\Theta S^*, CS^*, \Theta_2^*, \Theta_3^*, S\Theta^*, \text{ or } S\Theta_2^*$

Olczyna and Heicklen JPCHAX-1970-74-4188

$M^* = N_2^*(X^1\Sigma_g^+, v > 4)$

Schofield, K. PLSSAE-1965-15-643 (evaluation)

$M^* = \Theta^*(^1D)$

Baiamonte, et al. JCPA6-1971-55-3617

$M^* = \Theta_2^*(X^3\Sigma_g, v > 6)$

Schofield, K. PLSSAE-1965-15-643 (evaluation)

$M^* = \Theta_2^*(a^1\Delta_g)$

Findlay and Snelling JCPA6-1971-54-2750

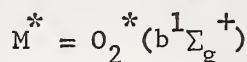
Kaufman and Kelso DFSOAW-1964-37-26 (mechanism)

Langley and McGrath PLSSAE-1971-19-413

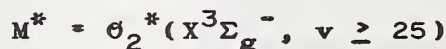
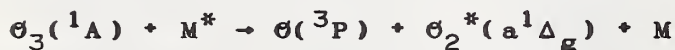
McNeal and Cook TAGUAT-1967-48-73

$\text{O}_3 + \text{M}^* \rightarrow \text{O} + \text{O}_2 + \text{M}$ (Continued)

Mathias and Schiff	JCPA6-1964-40-3118
Norrish and Wayne	PRLAAZ-1965-288-200 (mechanism)
Schofield, K.	PLSSAE-1965-15-643 (evaluation)
Snelling and Gauthier	CHPLBC-1971-9-254
Wayne, R. P.	ADPCA2-1969-7-311 (review)
Wayne, R. P.	ANYAA9-1970-171-199



Clyne, et al.	PHCBAP-1965-4-957 (mechanism)
Gauthier and Snelling	JCPA6-1971-54-4317
Heidt, L. J.	JACSAT-1935-57-1710
Kaufman and Kelso	DFSOW-1964-37-26 (mechanism)
Mathias and Schiff	JCPA6-1964-40-3118
Norrish and Wayne	PRLAAZ-1965-288-200 (mechanism)
Schofield, K.	PLSSAE-1965-15-643 (evaluation)
Wayne, R. P.	ADPCA2-1969-7-311 (review)



Schofield, K.	PLSSAE-1965-15-643 (evaluation)
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Norrish and Wayne	PRLAAZ-1965-288-200 (mechanism)
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Gill and Laidler	PRLAAZ-1959-250-121 (calculation)
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Bunker, D. L.	JCPA6-1964-40-1946 (calculation)
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II(b). REVIEWS

Bodenstein and Jost	B00KA7-1941-267
Bortner, et al.	*GESLZ6-1970-RPT/DASA-2560 (N ₂ , NO excitation, relaxation, energy transfer)
Cottrell and McCoubrey	B00KA7-1961-(O ₂ rot. and vibr. relax.: pgs. 82, 84)
Donovan and Husain	CHREAY-1970-70-489 (O*)
Gilmore, et al.	JQSRAE-1969-9-157 (O, O ₂ excitation and relaxation)
Herzfeld and Litovitz	PAPHAP-1959-7 (O ₂ rot. and vibr. relax.: pgs. 238, 241)

Johnston, H. S.	SCIEAS-1971-173-517 (θ , θ_2 , θ_3)
Kearns, D. R.	CHREAY-1971-74-395 [$\theta_2^*(A^1\Delta_g)$ and $\theta_2^*(b^1\Sigma_g^+)$]
Kneser, H. O.	EENAA3-1949-22-121 (θ_2 vibrational relaxation)
Kondratiev, V. N.	B00KA7-1970 (θ , θ_2 , θ_3 : General Tables)
McCoubrey, et al.	TFS0A4-1961-57-1472 (θ_2 vibrational relaxation)
Moore, C. B.	ACHRAY-1969-2-103 (θ_2 vibrational energy transfer)
Pitts, J. N., Jr.	ANYAA9-1970-171-239 $3\theta_2^*(^1\Delta_g)$]
Pitts, J. N., Jr.	24ZVAA-1971-3 [$\theta_2^*(^1\Delta_g)$]
Schiff, H. J.	CJCHAG-1969-47-1903
Taylor and Bitterman	RMPHAT-1969-41-26 (θ_2 vibrational energy transfer)
Wayne, R. P.	ADPCA2-1969-7-311 [$\theta_2^*(a^1\Delta_g)$ and $\theta_2^*(b^1\Sigma_g^+)$]

III. AUTHOR LIST OF REFERENCES

- Abello, T. P., "Absorption of Ultrasonic Waves by Various Gases," *Phys. Rev.* 31, 1083 (1928)
- Ackerman, R. A., Pitts, J. N., Jr., and Steer, R. P., "Singlet Oxygen in the Environmental Sciences. VIII. Absolute Rates of Deactivation of $O_2(^1\Delta_g)$ by Terminal Olefins, Tetramethylethylene, and Methyl Chloride," *J. Chem. Phys.* 52, 1603 (1970)
- Ackerman, R. A., Rosenthal, I., and Pitts, J. N., Jr., "Singlet Oxygen in the Environmental Sciences. X. Absolute Rates of Deactivation of $O_2(^1\Delta_g)$ in the Gas Phase by Sulfur Compounds," *J. Chem. Phys.* 54, 4960 (1971)
- Ajello, J. M., "Dissociative Excitation of O_2 in the Vacuum Ultraviolet by Electron Impact," *J. Chem. Phys.* 55, 3156 (1971)
- Akimoto, H., and Pitts, J. N., Jr., "Emission Spectra of $O_2(^1\Delta_g)$ Trapped in Solid Oxygen at 4.2°K," *J. Chem. Phys.* 53, 1312 (1970)
- Andreev, E. A., "Quasi-Resonance Energy Transfer in Molecular Collisions. Vibrational Energy Exchange Between N_2 and CO_2 Molecules," *Chem. Phys. Ltrs.* 11, 429 (1971)
- Andrews, L. J., and Abrahamson, E. W., "Formation of $O_2(^1\Sigma_g^+)$ by 1-Fluoronaphthalene Sensitization," *Chem. Phys. Ltrs.* 10, 113 (1971)
- Angerer, E. v., and Ladenburg, R., "Experimentelle Beiträge zur Ausbreitung des Schalles in der freien Atmosphäre," *Ann. Physik* [4] 66, 293 (1921)
- Appleton, J. P., "Shock-Tube Study of the Vibrational Relaxation of Nitrogen Using Vacuum-Ultraviolet Light Absorption," *J. Chem. Phys.* 47, 3231 (1967)
- Appleton, J. P., and Steinberg, M., "Vacuum-Ultraviolet Absorption of Shock-Heated Vibrationally Excited Nitrogen," *J. Chem. Phys.* 46, 1521 (1967)
- Arditi, I., Margottin-Maclou, M., Gueguen, H., and Doyennette, L., "Relaxation Vibrationnelle du Protoxyde d'Azote Optiquement Excité sur le Niveau (00^0_1)," *Compt. Rend. Acad. Sci., Paris, B* 270, 477 (1970)
- Arnold, J. S., Browne, R. J., and Ogryzlo, E. A., "The Red Emission Bands of Molecular Oxygen," *Photochem. Photobiol.* 4, 963 (1965)

- Arnold, J. W., McCoubrey, J. C., and Ubbelohde, A. R.,
 "Temperature Dependence of Transition Probabilities.
 Vibration-Translation in Polyatomic Gases," Trans. Faraday
 Soc. 53, 738 (1957)
- Arnold, J. W., McCoubrey, J. C., and Ubbelohde, A. R.,
 "Efficiencies of Additives in the Transfer of Vibrational
 Energy in Ethylene and Nitrous Oxide," Proc. Roy. Soc.
 (London), A 248, 445 (1958)
- Arnold, S. J., Finlayson, N., and Ogryzlo, E. A., "Some Novel
 Energy-Pooling Processes Involving $O_2(^1\Delta_g)$," J. Chem.
 Phys. 44, 2529 (1966)
- Arnold, S. J., Kubo, M., and Ogryzlo, E. A., "Relaxation and
 Reactivity of Singlet Oxygen," Advan. Chem. Ser. 77, 133
 (1968)
- Arnold, S. J., and Ogryzlo, E. A., "Some Reactions Forming
 $O_2(^1\Sigma_g^+)$ in the Upper Atmosphere," Can. J. Phys. 45, 2053
 (1967)
- Arnold, S. J., Ogryzlo, E. A., and Witzke, H., "Some New
 Emission Bands of Molecular Oxygen," J. Chem. Phys. 40,
 1769 (1964)
- Bader, L. W., and Ogryzlo, E. A., "Reactions of $O_2(^1\Delta_g)$ and
 $O_2(^1\Sigma_g^+)$," Discussions Faraday Soc. 37, 46 (1964)
- Badger, R. M., Wright, A. C., and Whitlock, R. F., "Absolute
 Intensities of the Discrete and Continuous Absorption
 Bands of Oxygen Gas at 1.26 and 1.065 μ and the Radiative
 Lifetime of the $^1\Delta_g$ State of Oxygen," J. Chem. Phys. 43,
 4345 (1965)
- Baiamonte, V. D., Hartshorn, L. G., and Bair, E. J., "Ozone
 Ultraviolet Photolysis. III. Disposition of Vibrational
 Energy," J. Chem. Phys. 55, 3617 (1971)
- Barth, C. A., and Hildebrandt, A. F., "The 5577A Airglow
 Emission Mechanism," J. Geophys. Res. 66, 985 (1961)
- Bates, D. R., and Dalgarno, A., "The Altitudes of the
 Luminous Layers in the Earth's Atmosphere," J. Atmospheric
 Terrest. Phys. 4, 112 (1953)
- Bates, R. D., Jr., Flynn, G. W., and Ronn, A. M.,
 "Laser-Induced Vibrational Fluorescence in Nitrous Oxide,"
 J. Chem. Phys. 49, 1432 (1968)
- Batten, J. J., and Johnston, G. R., "A Preliminary Study of
 the Reaction Between Nitrous Oxide and Nitrogen Dioxide,"
 Intern. J. Chem. Kinetics 3, 381 (1971)

- Bauer, H.-J., Kneser, H. O., and Sittig, E., "Die Schallausbreitung in teilweise dissoziiertem N_2O_4 und N_2O_3 ," *Acustica* 9, 181 (1959)
- Bauer, H.-J., Kneser, H. O., and Sittig, E., "Oscillation, Rotation, and Spin Relaxation in NO ," *J. Chem. Phys.* 30, 1119 (1959)
- Bauer, H.-J., and Roesler, H., "Schwingungsrelaxation in binären Gemischen zweiatomiger Gase," *Z. Naturforsch.* 19A, 656 (1964)
- Bauer, H.-J., and Sahm, K. F., "Relaxation of the Vibrational, Electronic, and Rotational Degrees of Freedom of the NO Molecule," *J. Chem. Phys.* 42, 3400 (1965)
- Beale, G. E., Jr., and Broida, H. P., "Spectral Study of a Visible, Short-Duration Afterglow in Nitrogen," *J. Chem. Phys.* 31, 1030 (1959)
- Bell, T. N., Robinson, P. L., and Trenwith, A. B., "The Kinetics of the Oxidation of Sulphur Dioxide by Nitrous Oxide," *J. Chem. Soc.* 1440 (1955)
- Bender, D., "Ultraschallgeschwindigkeiten in Stickstoff, Stickoxyd und Kohlenoxyd zwischen 20 und 200° C, gemessen mit einem neuen Verfahren," *Ann. Physik* [5] 38, 199 (1940)
- Bennett, R. G., and Dalby, F. W., "Experimental Determination of the Oscillator Strength of the First Negative Bands of N_2^+ ," *J. Chem. Phys.* 31, 434 (1959)
- Benson, S. W., and Berend, G. C., "Vibrational Relaxation of Diatomic Molecules," *J. Chem. Phys.* 44, 470 (1966)
- Beretta, U., and Schumacher, H.-J., "Die Photokinetik des Ozons. II. Der Zerfall des Ozons im ultravioletten Licht," *Z. Physik. Chem.* B17, 417 (1932)
- Biedenkapp, D., and Bair, E. J., "Ozone Ultraviolet Photolysis. I. The Effect of Molecular Oxygen," *J. Chem. Phys.* 52, 6119 (1970)
- Biedenkapp, D., Hartshorn, L. G., and Bair, E. J., "The $O(^1D) + H_2O$ Reaction," *Chem. Phys. Ltrs.* 5, 379 (1970)
- Billingsley, J., and Callear, A. B., "Negative Temperature Coefficient of the Vibrational Relaxation of Nitric Oxide: an Orientation Effect," *Nature* 221, 1136 (1969)
- Billingsley, J., and Callear, A. B., "Vibrational Relaxation of Nitric Oxide in Ternary Collisions," *Nature* 224, 687 (1969)
- Billingsley, J., and Callear, A. B., "Kinetics and Mechanism of the Vibrational Relaxation of $NO X^2\Pi(v = 1)$ in the Temperature Range 100-433 K," *Trans. Faraday Soc.* 67, 257 (1971)

- Billiotte, M., Guenoche, H., and Sedes, C., "Dissociation de l'Oxygène Porté à Haute Température par une Onde de Choc," *Entropie*, No. 38, 5 (1971)
- Blend, H., "Free-Field Technique for Measuring Ultrasonic Dispersion and Absorption in Gases," *J. Acoust. Soc. Am.* 47, 757 (1970)
- Bodenstein, M., and Jost, W., "Katalyse bei homogenen Gasreaktionen," in *Handbuch der Katalyse*, G. M. Schwab, editor, (Springer-Verlag, Wien, 1941, Vol. I pg. 267, reprinted, J. W. Edwards, Ann Arbor, Michigan 1945)
- Borst, W. L., and Zipf, E. C., "Lifetimes of Metastable CO and N₂ Molecules," *Phys. Rev.* A3, 979 (1971)
- Bortner, M. H., Carabetta, R. A., and Kummler, R. H., "Metal Oxide Studies," General Electric Co. (Space Div.), Final Report DASA 2560 (October 1970)
- Bortner, M., and Kummler, R., "The Chemical Kinetics and the Composition of the Earth's Atmosphere," General Electric Company, (Space Sciences Lab. Missile and Space Div.), Report No. GE-9500-ECS-SR-1 (July 1968)
- Bowman, C. T., "Investigation of Nitric Oxide Formation Kinetics in Combustion Processes: The Hydrogen-Oxygen-Nitrogen Reaction," *Combust. Sci. Technol.* 3, 37 (1971)
- Boyer, R. A., "Ultrasonic Velocities in Gases at Low Pressures," *J. Acoust. Soc. Am.* 23, 176 (1951)
- Bradley, J. N., and Lewis, D., "Vibrational Relaxation of Nitric Oxide," *J. Chem. Phys.* 50, 544 (1969)
- Brennen, W., and Shane, E. C., "The Nitrogen Afterglow and the Rate of Recombination of Nitrogen Atoms in the Presence of Nitrogen, Argon, and Helium," *J. Phys. Chem.* 75, 1552 (1971); See also: Shane, *Diss. Abstr. Intern.* 31, 3312 (1970)
- Breshears, W. D., and Bird, P. F., "Effect of Oxygen Atoms on the Vibrational Relaxation of Nitrogen," *J. Chem. Phys.* 48, 4768 (1968)
- Breshears, W. D., and Bird, P. F., "Vibrational Relaxation of Nitric Oxide at 500-1,900 K," *Nature* 224, 268 (1969)
- Breshears, W. D., Bird, P. F., and Kiefer, J. H., "Density Gradient Measurements of O₂ Dissociation in Shock Waves," *J. Chem. Phys.* 55, 4017 (1971)
- Briner, E., and Kurbassi, H., "Observations sur la Photolyse de l'Oxyde Biazotique (Protoxyde d'Azote) à l'État Comprimé," *Helv. Chim. Acta* 28, 1204 (1945)

- Brocklehurst, B., "General Discussion," Discussions Faraday Soc. 33, 88 (1962)
- Brocklehurst, B., "Luminescence of Gases Excited by High-Energy Radiation. Part I. Collisional Deactivation in Nitrogen," Trans. Faraday Soc. 60, 2151 (1964)
- Brocklehurst, B., and Downing, F. A., "Mechanisms of Excitation of Luminescence in Nitrogen Gas by Fast Electrons," J. Chem. Phys. 46, 2976 (1967)
- Broadbent, A. D., Gleason, W. S., Pitts, J. N., Jr., and Whittle, E., "The Reactions between $O_2(^1\Delta_g)$ and Tetramethylethylene and 2,5-Dimethylfuran in the Gas Phase," Chem. Commun. (London) 131 (1968)
- Brömer, H. H., and Spieweck, F., "Lifetime and Diffusion Coefficient of the $A^3\Sigma_u^+$ State of N_2 ," Planet. Space Sci. 15, 689 (1967)
- Brömer, H. H., and Zwirner, W., "Quantitative Untersuchungen von Chemolumineszenzreaktionen in atmosphärischen Gasen," Z. Naturforsch. 24A, 118 (1969)
- Brout, R., "Rotational Energy Transfer in Diatomic Molecules," J. Chem. Phys. 22, 1189 (1954)
- Bubért, H., "Population and Predissociation of Vibronic States of Nitric Oxide," J. Chem. Phys. 56, 1113 (1972)
- Bunker, D. L., "Monte Carlo Calculation of Triatomic Dissociation Rates. I. N_2O and O_3 ," J. Chem. Phys. 37, 393 (1962)
- Bunker, D. L., "Monte Carlo Calculations. IV. Further Studies of Unimolecular Dissociation," J. Chem. Phys. 40, 1946 (1964)
- Buschmann, K. F., and Schäfer, K., "Die Stossanregung intramolekularer Schwingungen in Gasen und Gasmischungen. VIII. Untersuchung der Anregbarkeit verschiedener Normalschwingungen auf Grund exakter Schalldispersionsmessungen," Z. Physik. Chem. B 50, 73 (1941)
- Callear, A. B., "Vibrational Relaxation of Nitric Oxide," Discussions Faraday Soc. 33, 28 (1962)
- Callear, A. B., and Pilling, M. J., "Fluorescence of Nitric Oxide. Part 7. Quenching Rates of $NO\ C^2\Pi(v=0)$, its Rate of Radiation to $NO\ A^2\Sigma^+$, Energy Transfer Efficiencies, and Mechanisms of Predissociation," Trans. Faraday Soc. 66, 1618 (1970)
- Callear, A. B., and Pilling, M. J., "Fluorescence of Nitric Oxide. Part 6. Predissociation and Cascade Quenching in $NO\ D^2\Sigma^+(v=0)$ and $NO\ C^2\Pi(v=0)$, and the Oscillator Strengths of the $\epsilon(0,0)$ and $\delta(0,0)$ Bands," Trans. Faraday Soc. 66, 1886 (1970)

- Callear, A. B., Pilling, M. J., and Smith, I. W. M., "Fluorescence of Nitric Oxide. Part 5. Mean Lifetime in the $D^2\Sigma^+$ State," Trans. Faraday Soc. 64, 2296 (1968)
- Callear, A. B., and Williams, G. J., "Relaxation of Vibrationally Excited Nitric Oxide by some Triatomic Hydrides," Trans. Faraday Soc. 62, 2030 (1966)
- Callear, A. B., and Wood, P. M., "Rates of Energy Transfer from $N_2 A^3\Sigma_u^+$ to Various Molecules. Initial and Final Quantum States in the Transfer to $NO X^2\Pi$ and $Hg(6^1S_0)$, and Vibrational Relaxation of $N_2 A^3\Sigma_u^+(v = 1)$ in Helium," Trans. Faraday Soc. 67, 272 (1971)
- Callear, A. B., and Wood, P. M., "A Simple Technique for the Measurement of Rates of Deactivation of $N_2 A^3\Sigma_u^+$," Trans. Faraday Soc. 67, 598 (1971)
- Calo, J. M., and Axtmann, R. C., "Cross Section for the Production of $N_2(C^3\Pi_u)$ from Metastable Argon Atoms," J. Chem. Phys. 54, 4961 (1971)
- Calvert, J. B., "Sound Absorption in Oxygen/Water-Vapor Mixtures," J. Acoust. Soc. Am. 37, 386 (1965)
- Campbell, I. M., and Thrush, B. A., "The Recombination of Nitrogen Atoms and The Nitrogen Afterglow," Proc. Roy. Soc. (London) A 296, 201 (1967)
- Carabetta, R., and Kaskan, W., "Chemi-Excitation of Sodium in Flames," Symp. Combust., 11th (Combustion Institute, Pittsburgh, 1967) 321
- Carleton, N. P., and Eldenberg, S., "Lifetime of the Lowest Excited Level of N_2 ," J. Chem. Phys. 36, 3460 (1962)
- Cary, B., "Shock-Tube Study of the Thermal Dissociation of Nitrogen," Phys. Fluids 8, 26 (1965); revised in "Reply to comments by Kurt Wray and Stanley Byron (Phys. Fluids 9, 1046 (1966)) Phys. Fluids 9, 1047 (1966)
- Castellano, E., and Schumacher, H. J., "Die Kinetik des photochemischen Ozonzerfalles im Licht der Wellenlänge $313\text{ m}\mu$," Z. Physik. Chem. [NF] 76, 258 (1971)
- Cheo, P. K., "Effects of CO_2 , He, and N_2 on the Lifetimes of the 00^0_1 and 10^0_0 CO_2 Laser Levels and on Pulsed Gain at $10.6\text{ }\mu$," J. Appl. Phys. 38, 3563 (1967)

- Childs, W. H. J., "Absorption Measurements and Transition Probabilities for the A(0,0) and B(0,1) Bands of Oxygen," Phil. Mag. S. [7] 14, 1049 (1932)
- Childs, W. H. J., and Mecke, R., "Intensitätsmessungen in der atmosphärischen Sauerstoffbande λ 7600," Z. Physik 68, 344 (1931)
- Clark, A. V., and Henderson, M. C., "Vibrational Relaxation in Dry and Moist Oxygen," J. Acoust. Soc. Am. 35, 1909 (1963)
- Clark, I. D., and Wayne, R. P., "The Collisional Deactivation of $\text{O}_2(^1\Delta_g)$," Chem. Phys. Ltrs. 3, 93 (1969)
- Clark, I. D., and Wayne, R. P., "The Reaction of $\text{O}_2(^1\Delta_g)$ with Atomic Nitrogen and with Atomic Oxygen," Chem. Phys. Ltrs. 3, 405 (1969)
- Clark, I. D., and Wayne, R. P., "Collisional Quenching of $\text{O}_2(^1\Delta_g)$," Proc. Roy. Soc. (London), A 314, 111 (1969)
- Clerc, M., and Barat, F., "Cinétique des Produits de Décomposition de CO_2 par Photolyse-Éclair dans l'Ultraviolet Lointain," J. Chim. Phys. 63, 1525 (1966)
- Clerc, M., and Barat, F., "Kinetics of CO Formation Studied by Far-uv Flash Photolysis of CO_2 ," J. Chem. Phys. 46, 107 (1967)
- Clouston, J. G., Gaydon, A. G., and Glass, I. I., "Temperature Measurements of Shock Waves by the Spectrum-Line Reversal Method," Proc. Roy. Soc. (London), A 248, 429 (1958)
- Clyne, M. A. A., McKenney, D. J., and Thrush, B. A., "Rate of Combination of Oxygen Atoms with Oxygen Molecules," Trans. Faraday Soc. 61, 2701 (1965)
- Clyne, M. A. A., Thrush, B. A., and Wayne, R. P., "The Formation and Reactions of Metastable Oxygen ($^1\Sigma_g^+$) Molecules," Photochem. Photobiol. 4, 957 (1965)
- Colwell, R. C., Friend, A. W., and McGraw, D. A., "The Velocity of Sound in Air," Phys. Rev. 53, 686 (1938)
- Connor, J. V., "Ultrasonic Dispersion in Oxygen," J. Acoust. Soc. Am. 30, 297 (1958)
- Coomber, J. W., and Pitts, J. N., Jr., "Singlet Oxygen in the Environmental Sciences. VIII. Production of $\text{O}_2(^1\Delta_g)$ by Energy Transfer from Excited Benzaldehyde under Simulated Atmospheric Conditions," Environ. Sci. Technol. 4, 506 (1970)

- Copeland, G. E., "Lifetimes of the $v' = 0, 1, 2$ Levels of the $A^2\Sigma^+$ Electronic State of $N\theta$," J. Chem. Phys. 56, 689 (1972)
- Copeland, G. E., Thompson, R. T., and Fowler, R. G., "Lifetimes of the $A^2\Sigma^+$ State of $N\theta$," Bull. Am. Phys. Soc. (II) 15, 429 (1970)
- Cottrell, T. L., and Day, M. A., "Effect of Oxygen on Vibrational Relaxation in Methane," J. Chem. Phys. 43, 1433 (1965)
- Cottrell, T. L., MacFarlane, I. M., and Read, A. W., "Measurement of Vibrational Relaxation Times by the Spectrophone. Systems $CO_2 + N_2$ and $N_2\theta + N_2$," Trans. Faraday Soc. 63, 2093 (1967)
- Cottrell, T. L., MacFarlane, I. M., Read, A. W., and Young, A. H., "Measurement of Vibrational Relaxation Times by the Spectrophone. Application to CH_4 , CO_2 , $N_2\theta$, CO_2S , NH_3 , and HCN ," Trans. Faraday Soc. 62, 2655 (1966)
- Cottrell, T. L., and McCoubrey, J. C., "Molecular Energy Transfer in Gases," (Butterworths, London, 1961)
- Crosley, D. R., and Zare, R. N., "Observation of Optical Radio-Frequency Double Resonance in Molecular Fluorescence," J. Chem. Phys. 49, 4231 (1968)
- Cupitt, L. T., and Glass, G. P., "Calculation of Absolute Concentrations of SH and $S\theta$ from their E.S.R. Spectra," Trans. Faraday Soc. 67, 1 (1971)
- Curtis, R. W., "An Experimental Determination of Ultrasonic Absorption and Reflection Coefficients in Air and in Carbon Dioxide," Phys. Rev. 46, 811 (1934)
- Cvetanović, R. J., "Mercury Photosensitized Decomposition of Nitrous Oxide," J. Chem. Phys. 23, 1203 (1955)
- Cvetanović, R. J., "Relative Efficiencies of Quenching of Mercury Resonance Radiation and Their Temperature Independence. Mechanism of Mercury Photosensitized Decomposition of Saturated Hydrocarbons," J. Chem. Phys. 23, 1208 (1955)
- Dadaian, A. T., and Pumper, E. J., "Mesure de l'Absorption des Ondes Ultra-Sonores dans l'Air et dans l'Argon," Compt. Rend. (Doklady) Acad. Sci. URSS 20, 539 (1938)
- Dalgarno, A., and Walker, J. C. G., "The Red Line of Atomic Oxygen in the Day Airglow," J. Atmospheric Sci. 21, 463 (1964)
- DeMore, W. B., "Reaction of $\theta(^1D)$ with H_2 and the Reactions of H and θH with Ozone," J. Chem. Phys. 47, 2777 (1967)

- DeMore, W. B., and Dede, C., "Pressure Dependence of Carbon Trioxide Formation in the Gas-Phase Reaction of $\Theta(^1D)$ with Carbon Dioxide," J. Phys. Chem. 74, 2621 (1970)
- DeMore, W. B., and Raper, G. F., "Reaction of $\Theta(^1D)$ with Nitrogen," J. Chem. Phys. 37, 2048 (1962)
- DeMore, W. B., and Raper, G. F., "Primary Processes in Ozone Photolysis," J. Chem. Phys. 44, 1780 (1966)
- DeMore, W. B., and Raper, G. F., "Reaction of $\Theta(^1D)$ with Methane," J. Chem. Phys. 46, 2500 (1967)
- Derwent, R. G., Kearns, D. R., and Thrush, B. A., "The Excitation of Iodine by Singlet Molecular Oxygen," Chem. Phys. Ltrs. 6, 115 (1970)
- Derwent, R. G., and Thrush, B. A., "Measurements on $\Theta_2 ^1\Delta_g$ and $\Theta_2 ^1\Sigma_g^+$ in Discharge Flow Systems," Trans. Faraday Soc. 67, 2036 (1971)
- Dickens, P. G., and Ripamonti, A., "Calculation of Vibrational Relaxation Times in Gases," Trans. Faraday Soc. 57, 735 (1961)
- Dimitriadis, B., and Whisman, M. L., "Aldehyde-Olefin Interaction in the Nitrogen Oxide-Sensitized Photooxidation of Aliphatic Olefins," Proc. Symp. Chem. Reactions Urban Atmosp., C. S. Tuesday, editor, (American Elsevier Publishing Co., New York 1971) pg. 89
- Dixon, H. B., Campbell, C., and Parker, A., "On the Velocity of Sound in Gases at High Temperatures, and the Ratio of the Specific Heats," Proc. Roy. Soc. (London), 100, 1 (1922)
- Dodge, M. C., and Heicklen, J., "The Photolysis of $N_2\Theta$ at 1470 Å," Intern. J. Chem. Kinetics 3, 269 (1971)
- Donovan, R. J., and Husain, D., "Recent Advances in the Chemistry of Electronically Excited Atoms," Chem. Rev. 70, 489 (1970)
- Donovan, R. J., Husain, D., and Kirsch, L. J., "Reactions of Oxygen Atoms. Part 3. Reaction of $\Theta(2^3P_j)$ and $\Theta(2^1D_2)$ with $C\Theta$ and $C\Theta_2$," Trans. Faraday Soc. 67, 375 (1971)
- Donovan, R. J., Kirsch, L. J., and Husain, D., "Collisional Deactivation of the Electronically Excited Atoms, $S(3^1D_2)$ and $S(3^1S_0)$, by the Noble Gases," Trans. Faraday Soc. 66, 774 (1970)

- Duncan, C. K., and Kearns, D. R., "The Annihilation of $^1\Delta_g$ Oxygen by Excited Triplet State Sensitizers," Chem. Phys. Ltrs. 12, 306 (1971)
- Ellis, D. M., McGarvey, J. J., and McGrath, W. D., "Reaction of $\Theta(^3P)$ Atoms with Ozone," Nature 229, 153 (1971)
- Ener, C., Gabrysh, A. F., and Hubbard, J. C., "Ultrasonic Velocity, Dispersion, and Absorption in Dry, CO_2 -Free Air," J. Acoust. Soc. Am. 24, 474 (1952)
- Engelhardt, A. G., Phelps, A. V., and Risk, C. G., "Determination of Momentum Transfer and Inelastic Collision Cross Sections for Electrons in Nitrogen Using Transport Coefficients," Phys. Rev. A 135, 1566 (1964); superseded: Bull. Am. Phys. Soc. [II] 9, 187 (1964)
- Esclancon, E., "Sur une Nouvelle Détermination de la Vitesse du son a l'Air Libre," Compt. Rend. Acad. Sci., Paris, 168, 165 (1919)
- Eucken, A., and Jaacks, H., "Die Stossanregung intramolekularer Schwingungen in Gasen und Gasmischungen auf Grund von Schalldispersionsmessungen. III. Messungen an Stickoxydul," Z. Physik. Chem. B 30, 85 (1935)
- Eucken, A., and Nümann, E., "Die Stossanregung intramolekularer Schwingungen in Gasen und Gasmischungen. IV. Schalldispersions und Absorptionsmessungen an N_2O and CO_2 bei hohen Temperaturen," Z. Physik. Chem. B 36, 163 (1937)
- Evans, E. J., and Bazley, E. N., "The Absorption of Sound in Air at Audio Frequencies," Acustica 6, 238 (1956)
- Evans, W. F. J., Hunten, D. M., Llewellyn, E. J., and Vallance Jones, A., "Altitude Profile of the Infrared Atmospheric System of Oxygen in the Dayglow," J. Geophys. Res. 73, 2885 (1968)
- Evans, W. F. J., and Vallance Jones, A., "Some Observations of Type-B Red Aurora with a Multichannel Photometer," Can. J. Phys. 43, 697 (1965)
- Evans, W. F. J., Llewellyn, E. J., and Vallance Jones, A., "Balloon Observations of the Temporal Variation of the Infrared Atmospheric Oxygen Bands in the Airglow," Planet. Space Sci. 17, 933 (1969)
- Falick, A. M., and Mahn, B. H., "Collisional-Radiative Reaction of $\Theta_2(^1\Delta_g)$," J. Chem. Phys. 47, 4778 (1967)
- Filseth, S. V., and Welge, K. H., "Measurement of the Deactivation Rate of $\Theta_2(b^1\Sigma_g^+)$," Ann. N.Y. Acad. Sci. 171, 226 (1970)

- Filseth, S. V., Zia, A., and Welge, K. H., "Flash Photolytic Production Reactive Lifetime, and Collisional Quenching $\Theta_2(b^1\Sigma_g^+, v'=0)$," J. Chem. Phys. 52, 5502 (1970); Erratum: J. Chem. Phys. 56, 3733 (1972)
- Findlay, F. D., Fortin, C. J., and Snelling, D. R., "Deactivation of $\Theta_2(^1\Delta_g)$," Chem. Phys. Ltrs. 3, 204 (1969)
- Findlay, F. D., and Snelling, D. R., "Temperature Dependence of the Rate Constant for the Reaction $\Theta_2(^1\Delta_g) + \Theta_3 \rightarrow 2\Theta_2 + \Theta$," J. Chem. Phys. 54, 2750 (1971)
- Findlay, F. D., and Snelling, D. R., "Collisional Deactivation of $\Theta_2(^1\Delta_g)$," J. Chem. Phys. 55, 545 (1971)
- Fishburne, E. S., "Transfer of Electronic Energy between a Metastable Argon Atom and a Nitrogen Molecule," J. Chem. Phys. 47, 58 (1967)
- Flagan, R. C., and Appleton, J. P., "The Excitation Mechanism of the Nitrogen First Positive and First Negative Radiation at High Temperature," Mass. Inst. Technol., Fluid Mechanics Lab., Publication 71-7, (1971) AD 723 530
- Fontijn, A., and Ellison, R., "Formation of Electronically Excited Species in Nitrogen Atom-Oxygen Atom Recombination Reactions Catalyzed by Carbon Compounds: $N\Theta(A^2\Sigma, B^2\Pi)$ and $\Theta_2(^1S)$," J. Phys. Chem. 72, 3701 (1968)
- Foong, S. K., and Ratcliffe, J. S., "The Stability of a Backmix Chemical Reactor to Reactant Feed Rate Variations and to Density Changes during Reaction," Mech. Chem. Eng. Trans., Institution of Engineers, Australia, 6, 25 (1970)
- Francis, P. D., "The Production of Oxygen Atoms in a Microwave Discharge and the Recombination Kinetics in a Gas Flow System," Brit. J. Appl. Phys. 2, 1717 (1969)
- Freund, R. S., "Molecular-Beam Measurements of the Emission Spectrum and Radiative Lifetime of N_2 in the Metastable $E^3\Sigma_g^+$ State," J. Chem. Phys. 50, 3734 (1969)
- Fritzsche, L., "Präzisionsmessung der klassischen Schallabsorption mit Hilfe des Zylinderresonators (I)," Acustica 10, 189 (1960)
- Fujii, Y., Lindsay, R. B., and Urushihara, K., "Ultrasonic Absorption and Relaxation Times in Nitrogen, Oxygen, and Water Vapor," J. Acoust. Soc. Am. 35, 961 (1963); supersedes J. Acoust. Soc. Am. 34, 714 (1962) and Proc. 4th Intern. Congress Acoust. 4, k24 (1962)

- Furukawa, K., Gray, E. W., and Ogryzlo, E. A., "Singlet Oxygen from Discharge-Flow Systems," Ann. N.Y. Acad. Sci. 171, 175 (1970)
- Furukawa, K., and Ogryzlo, E. A., "Quenching of $\text{O}_2(^1\Delta_g)$ by Organic Molecules," Chem. Phys. Ltrs. 12, 370 (1971)
- Garnett, S. H., Kistiakowsky, G. B., and O'Grady, B. V., "Isotopic Exchange between Oxygen and Carbon Monoxide in Shock Waves," J. Chem. Phys. 51, 84 (1969)
- Gauthier, M., and Snelling, D. R., "Formation of Singlet Molecular Oxygen from Ozone Photolysis at 2,537 Å," Ann. N.Y. Acad. Sci. 171, 220 (1970)
- Gauthier, M., and Snelling, D. R., "Mechanism of Singlet Molecular Oxygen Formation from Photolysis of Ozone at 2537 Å," J. Chem. Phys. 54, 4317 (1971)
- Gedye, G. R., "The Decomposition of Nitrous Oxide by Cathode Rays," J. Chem. Soc. 3016 (1931)
- Gerlovin, Ya. I., and Orlova, I. N., "Measurement of the Spontaneous Emission Probability of Several Gases," Opt. Spectr. (USSR) 16, 9 (1964); tr. of Opt. Spektrosk. 16, 17 (1964)
- German, K. R., Zare, R. N., and Crosley, D. R., "Reinvestigation of the Hanle Effect for the $\text{NO } A^2\Sigma^+$ State," J. Chem. Phys. 54, 4039 (1971)
- Gilbert, R. G., and Ross, I. G., "Unimolecular Reactions as Radiationless Transitions. Calculation of the Rate of Decomposition of N_2O ," Austr. J. Chem. 24, 1541 (1971)
- Gill, E. K., and Laidler, K. J., "Some Aspects of the Theory of Unimolecular Gas Reactions," Proc. Roy. Soc. (London), A 250, 121 (1959)
- Gilmore, F. R., Bauer, E., and McGowan, J. W., "A Review of Atomic and Molecular Excitation Mechanisms in Nonequilibrium Gases Up to 20 000°K," J. Quant. Spectr. Radiat. Trans. 9, 157 (1969)
- Gilpin, R., Schiff, H. I., and Welge, K. H., "Photodissociation of O_3 in the Hartley Band. Reactions of $\text{O}(^1\text{D})$ and $\text{O}_2(^1\Sigma_g^+)$ with O_3 and O_2 ," J. Chem. Phys. 55, 1087 (1971)
- Gleason, W. S., Broadbent, A. D., Whittle, E., and Pitts, J. N., Jr., "Singlet Oxygen in the Environmental Sciences. IV. Kinetics of the Reactions of Oxygen ($^1\Delta_g$) with Tetramethylethylene and 2,5-Dimethylfuran in the Gas Phase," J. Am. Chem. Soc. 92, 2068 (1970)

- Golde, M. F., and Thrush, B. A., "Vacuum Ultraviolet Emission by Active Nitrogen," Chem. Phys. Ltrs. 8, 375 (1971)
- Ghosh, S. N., and Jain, S. K., "Rate Coefficient for Two-Body N-Atoms Recombination," Current Sci. (India) 40, 29 (1971)
- Goldman, C. S., Greenberg, R. I., and Heicklen, J., "The Reactions of $\Theta(^1D)$ with Θ zone and Nitrous Θ xide," Intern. J. Chem. Kinetics 3, 501 (1971)
- Grabau, M., "A Study of the Velocity of Sound in Air," J. Acoust. Soc. Am. 5, 1 (1933)
- Granzow, A., Hoffman, M. Z., Lichtin, N. N., and Wason, S. K., "Production of $N_2(A^3\Sigma)$ and $CO(a^3\Pi)$ by $Hg(^1P_1)$ Photosensitization; Pressure Dependence of 2537-Å Emission," J. Phys. Chem. 72, 1402 (1968)
- Gray, E. W., and Ogryzlo, E. A., "The Cooperative Emission Bands of 'Singlet' Molecular Oxygen," Chem. Phys. Ltrs. 3, 658 (1969)
- Greenberg, R. I., and Heicklen, J., "Reaction of $\Theta(^1D)$ with $N_2\Theta$," Intern. J. Chem. Kinetics 2, 185 (1970); also issued as Natl. Space Admin. Contract Report NASA-CR-106835 (1969); N70-11899
- Greenberg, R. I., and Heicklen, J., "The Reaction of $\Theta(^1D)$ with CH_4 ," Intern. J. Chem. Kinetics 4, 417 (1972)
- Greene, E. F., and Hornig, D. F., "The Shape and Thickness of Shock Fronts in Argon, Hydrogen, Nitrogen, and Oxygen," J. Chem. Phys. 21, 617 (1953)
- Greenspan, M., "Rotational Relaxation in Nitrogen," J. Acoust. Soc. Am. 30, 672 (1958); see also J. Acoust. Soc. 31, 155 (1959)
- Greenspan, M., "Rotational Relaxation in Nitrogen, Oxygen, and Air," J. Acoust. Soc. Am. 31, 155 (1959); supersedes J. Acoust. Soc. Am. 30, 672 (1958)
- Griffith, W., "Vibrational Relaxation Times in Gases," J. Appl. Phys. 21, 1319 (1950)
- Griffith, W., Brickl, D., and Blackman, V., "Structure of Shock Waves in Polyatomic Gases," Phys. Rev. 102, 1209 (1956)
- Gross, R. W. F., and Cohen, N., "Temperature Dependence of Chemiluminescent Reactions. II. Nitric Oxide Afterglow," J. Chem. Phys. 48, 2582 (1968)
- Grossmann, E., "Schallabsorptionsmessungen in Gasen bei hohen Frequenzen," Ann. Physik [5] 13, 681 (1932)

- Groth, W. E., and Schierholz, H., "The Photolysis of Nitrous Oxide in the Far Ultraviolet," Planet. Space Sci. 1, 333 (1959)
- Grüneisen, E., and Merkel, E., "Schallgeschwindigkeit in Luft und Wasserstoff von 0°C. und 1 Atm.," Ann. Physik [4] 66, 344 (1921)
- Guénoche, H., Méolans, J., and Billiotte, M., "Sur la Mesure des temps de Relaxation de Vibration des Gaz Excités par Onde de Choc," Entropie No. 34-35, 49 (1970)
- Gulledge, I. S., Packer, D. M., Tilford, S. G., and Vanderslice, J. T., "Intensity Profiles of the 6300-Å and 5577-Å O I Lines in the Night Airglow," J. Geophys. Res. 73, 5535 (1968)
- Harlow, R. G., and Kitching, R., "Absorption of Sound in Mixtures of Oxygen and Water Vapor," J. Acoust. Soc. Am. 36, 1100 (1964)
- Harris, C. M., "Absorption of Sound in Air in the Audio-Frequency Range," J. Acoust. Soc. Am. 35, 11 (1963)
- Harris, C. M., "Absorption of Sound in Air versus Humidity and Temperature," J. Acoust. Soc. Am. 40, 148 (1966)
- Harris, C. M., and Tempest, W., "Absorption of Sound in Air below 1000 cps," J. Acoust. Soc. Am. 36, 2390 (1964)
- Harris, C. M., and Tempest, W., "Absorption of Sound in Oxygen/Water Mixtures," J. Acoust. Soc. Am. 36, 2416 (1964)
- Hebb, T. C., "The Velocity of Sound," Phys. Rev. [I] 20, 89 (1905)
- Hebb, T. C., "The Velocity of Sound and the Ratio of the Specific Heats for Air," Phys. Rev. 14, 74 (1919)
- Heicklen, J., "Reactions of $\text{NO}(\text{A}^2\Sigma^+)$ with Hydrogen, Methane, and Ethane," J. Phys. Chem. 70, 2456 (1966)
- Heicklen, J., and Johnston, T., "Reexamination of the Mercury-Photosensitized Oxidation of Perfluoropropene: Some Reactions of Electronically Excited Oxygen Molecules," J. Phys. Chem. 71, 1391 (1967)
- Heidt, L. J., "The Photolysis of Dry Ozone at $\lambda\lambda$ 208, 254, 280 and 313 m μ . II. Reaction Kinetics," J. Am. Chem. Soc. 57, 1710 (1935)
- Henderson, M. C., Clark, A. V., and Lintz, P. R., "Thermal Relaxation in Oxygen with H_2O , HDO , and D_2O Vapors as Impurities," J. Acoust. Soc. Am. 37, 457 (1965)
- Henderson, M. C., and Herzfeld, K. F., "Effect of Water Vapor on the Napier Frequency of Oxygen and Air," J. Acoust. Soc. Am. 37, 986 (1965)

- Henderson, M. C., and Queen, E. J., "Sonic Absorption in Oxygen with $\text{C}\delta_2$ Impurity," J. Acoust. Soc. Am. 34, 714 (1962)
- Henry, P. S. H., "The Energy Exchanges between Molecules," Proc. Cambridge Phil. Soc. 28, 249 (1932)
- Herron, J. T., and Huie, R. E., "Mass Spectrometric Studies of the Reactions of Singlet Oxygen in the Gas Phase," Ann. N.Y. Acad. Sci. 171, 229 (1970)
- Herron, J. T., and Huie, R. E., "Rate Constants for the Reactions of O_2 $^1\Delta_g$ with 2,3-Dimethyl-2-butene and 2,5-Dimethylfuran," J. Chem. Phys. 51, 4164 (1969)
- Herzfeld, K. F., and Litovitz, T. A., "Absorption and Dispersion of Ultrasonic Waves," Pure Appl. Phys. 7, 238, 241, 245, 252 (1959)
- Herzfeld, K. F., and Rice, F. O., "Dispersion and Absorption of High Frequency Sound Waves," Phys. Rev. 31, 691 (1928)
- Hesser, J. E., "Absolute Transition Probabilities in Ultraviolet Molecular Spectra," J. Chem. Phys. 48, 2518 (1968)
- Hesser, J. E., and Dressler, K., "Absolute Transition Probabilities in the Ultraviolet Spectrum of $\text{C}\delta$," Astrophys. J. 142, 389 (1965)
- Hesser, J. E., and Dressler, K., "Radiative Lifetimes of Ultraviolet Molecular Transitions," J. Chem. Phys. 45, 3149 (1966)
- Hippler, H., and Troe, J., "Hochdruckbereich der Rekombination $\text{O} + \text{O}_2 \rightarrow \text{O}_3$," Ber. Bunsenges. Physik. Chem. 75, 27 (1971)
- Hochanadel, C. J., and Ghormley, J. A., "Pulse Radiolysis of $\text{N}\delta$: Production of $\text{N}\delta_2$ and N_2O_3 and the Production and Relaxation of Vibrationally Excited $\text{N}\delta$," J. Chem. Phys. 50, 3075 (1969)
- Holland, R. F., "Excitation of Nitrogen by Electrons: The Lyman-Birge-Hopfield System of N_2 ," J. Chem. Phys. 51, 3940 (1969)
- Holmes, R., Jones, G. R., Pusat, N., and Tempest, W., "Rotational Relaxation in Helium+Oxygen and Helium+Nitrogen Mixtures," Trans. Faraday Soc. 58, 2342 (1962)
- Hubbard, J. C., "The Acoustic Resonator Interferometer: II. Ultrasonic Velocity and Absorption in Gases," Phys. Rev. 41, 523 (1932)

- Huber, P. W., and Kantrowitz, A., "Heat-Capacity Lag Measurements in Various Gases," J. Chem. Phys. 15, 275 (1947)
- Hunten, D. M., and McElroy, M. B., "Quenching of Metastable States of Atomic and Molecular Oxygen and Nitrogen," Rev. Geophys. 4, 303 (1966)
- Hurle, I. R., "Line-Reversal Studies of the Sodium Excitation Process Behind Shock Waves in N₂," J. Chem. Phys. 41, 3911 (1964)
- Ishii, C., "Supersonic Velocity in Gases," Sci. Papers Inst. Phys. Chem. Res. (Tokyo) 26, 201 (1935)
- Izod, T. P. J., and Wayne, R. P., "The Formation, Reaction and Deactivation of O₂(¹Σ_g⁺)," Proc. Roy. Soc. (London), A 308, 81 (1968)
- Jacox, M. E., and Bauer, S. H., "Collisional Energy Exchange in Gases. Use of the Spectrophone for Studying Relaxation Processes in Carbon Dioxide," J. Phys. Chem. 61, 833 (1957)
- Jensen, D. E., and Jones, G. A., "Gas-Phase Reaction Rate Coefficients for Rocketry Applications," Rocket Propulsion Est., Westcott, U.K., Tech. Rpt. No. 71/9 (Oct. 1971)
- Johnston, H., "Reduction of Stratospheric Ozone by Nitrogen Oxide Catalysts from Supersonic Transport Exhaust," Science 173, 517 (1971)
- Jonathan, N., and Petty, R., "Studies of the Nitrogen Yellow Afterglow at Low Pressures," J. Chem. Phys. 50, 3804 (1969)
- Jones, D. G., Lambert, J. D., and Stretton, J. L., "Vibrational Relaxation in Mixtures Containing Oxygen," Proc. Phys. Soc. 86, 857 (1965)
- Jones, I. T. N., and Wayne, R. P., "The Photolysis of Ozone by Ultraviolet Radiation. V. Photochemical Formation of O₂(¹Δ_g)," Proc. Roy. Soc. (London), A 321, 409 (1971)
- Kao, P. T., "Étude Expérimentale de la Vitesse de Propagation des Ultra-Sons dans des Gaz," Ann. Physik [5] 17, 315 (1932)
- Kaufman, F., and Kelso, J. R., "Rate Constant of the Reaction O + 2O₂ → O₃ + O₂," Discussions Faraday Soc. 37, 26 (1964)
- Kearns, D. R., "Physical and Chemical Properties of Singlet Molecular Oxygen," Chem. Rev. 71, 395 (1971)
- Kearns, D. R., Khan, A. U., Duncan, C. K., and Maki, A. H., "Detection of the Naphthalene-Photosensitized Generation of Singlet (¹Δ_g) Oxygen by Paramagnetic Resonance Spectroscopy," J. Am. Chem. Soc. 91, 1039 (1969)

- Keck, J., "Statistical Investigation of Dissociation Cross-Sections for Diatoms," Discussions Faraday soc. 33, 173 (1962)
- Keck, J., and Kalelkar, A., "Statistical Theory of Dissociation and Recombination for Moderately Complex Molecules," AVCØ - Everett Research Report, AVCØ Corp., Everett, Mass. (July 1968) Research Report 289; AD 838 786
- Keesom, W. H., van Itterbeek, A., and van Lammeren, J. A., "Measurements about the Velocity of Sound in Oxygen Gas," K. Akad. Amsterdam, Proc. 34, 996 (1931)
- Keesom, W. H., and van Lammeren, J. A., "Measurements about the Velocity of Sound in Nitrogen Gas," K. Akad. Amsterdam, Proc. 35, 727 (1932)
- Keller, H. H., "Ultraschallabsorption in Gasen," Physik. Z. 41, 386 (1940)
- Khan, A. U., Pitts, J. N., Jr., and Smith, E. B., "Singlet Oxygen in the Environmental Sciences. The Role of Singlet Molecular Oxygen in the Production of Photochemical Air Pollution," Environ. Sci. Technol. 1, 656 (1967)
- Kinoshita, M., and Ishii, C., "The Effect of Humidity on Supersonic Velocity in Air," Sci. Papers Inst. Phys. Chem. Res. Tokyo 19, 83 (1932)
- Kneser, H. Ø., "The Transfer of Vibrational Energy between Molecules," Bull. Am. Phys. Soc. 8, 17 (1933)
- Kneser, H. Ø., "Zusammenfassende Berichte," Z. Tech. Physik 16, 213 (1935)
- Kneser, H. Ø., "Die akustischen Relaxationserscheinungen," Z. Tech. Physik 19, 486 (1938)
- Kneser, H. Ø., "Die wahre Schallgeschwindigkeit in Luft," Ann. Physik [5] 34, 665 (1939)
- Kneser, H. Ø., "Schallabsorption, spezifische Wärme und Einstelldauer des Elektronenspins in Stickoxyd," Ann. Physik [5] 39, 261 (1941)
- Kneser, H. Ø., "Molekulare Schallabsorption und -dispersion," Ergeb. Exact. Naturw. 22, 121 (1949)
- Kneser, H. Ø., Bauer, H.-J., and Kosche, H., "Relaxation of Nitric Oxide in Mixtures with Argon," J. Acoust. Soc. Am. 41, 1029 (1967)
- Kneser, H. Ø., and Zühlke, J., "Einstelldauer der Schwingungsenergien bei CO₂ und N₂O," Z. Physik 77, 649 (1932)
- Knötzel, H., "Absorption hörbaren Schalles in Luft und ihre Abhängigkeit von Feuchte und Temperatur," Akust. Z. 5, 245 (1940)

- Knudsen, V. Ø., "The Effect of Humidity upon the Absorption of Sound in a Room, and a Determination of the Coefficients of Absorption of Sound in Air," J. Acoust. Soc. Am. 3, 126 (1931)
- Knudsen, V. Ø., "The Absorption of Sound in Air and Water Vapor," Bull. Am. Phys. Soc. 8, 16 (1933)
- Knudsen, V. Ø., "The Absorption of Sound in Gases," J. Acoust. Soc. Am. 6, 199 (1935)
- Knudsen, V. Ø., and Øbert, L., "The Transfer of Translational and Vibrational Energy in Oxygen as Influenced by Small Impurities of Water or Ammonia Vapor," Phys. Rev. 47, 256 (1935)
- Knudsen, V. Ø., and Øbert, L., "The Absorption of High Frequency Sound in Oxygen Containing Small Amounts of Water Vapor or Ammonia," J. Acoust. Soc. Am. 7, 249 (1936)
- Kondratiev, V. N., "Konstanty Skorosti Gazofaznykh Reaktsij Spravochnik," (Izdatelstvo "Nauka", Moskva, 1970); english translation: "Rate Constants of Gas Phase Reactions, Reference Book," Fristrom, R. M., ed. CCM-72-10014, Office of Standard Reference Data, NBS (NTIS, Springfield, Va., 1972)
- Kondratiev, V. N., and Intezarova, E. I., "Interaction Between CO and O," Intern. J. Chem. Kinetics 1, 105 (1969)
- Korolev, F. A., "Application of Töpler's Method to the Measurement of Ultra-Sound Absorption in Air," Compt. Rend. (Doklady) Acad. Sci. (URSS) 20, 545 (1938)
- Krasnooshkin, P. E., "On Supersonic Waves in Cylindrical Tubes and the Theory of the Acoustic Interferometer," Phys. Rev. 65, 190 (1944)
- Krezenski, D. C., Simonaitis, R., and Heicklen, J., "The Reactions of O(³P) with Ozone and Carbonyl Sulfide," Intern. J. Chem. Kinetics 3, 467 (1971); see also Dissertation Abstr. Intern. B 32, 2633 (1971)
- Küchler, L., "Die Stossausbeute beim N₂O-Zerfall," Naturwissenschaften 26, 104 (1938)
- Kukkamäki, T. J., "Neue Messung der Schallgeschwindigkeit in freier Luft," Annalen der Physik 31, 398 (1938)
- Kummler, R. H., and Bortner, M. H., "Production and Destruction Mechanisms for O₂(¹Δ_g) in the Lower Atmosphere," Ann. N.Y. Acad. Sci. 171, 273 (1970)
- Kummler, R. H., and Bortner, M. H., "Production of O₂(¹Δ_g) by Energy Transfer from Excited Benzaldehyde," Environ. Sci. Technol. 3, 944 (1969)

- Kummler, R. H., Bortner, M. H., and Baurer, T., "The Hartley Photolysis of Ozone as a Source of Singlet Oxygen in Polluted Atmospheres," Environ. Sci. Technol. 3, 248 (1969)
- Langley, K. F., and McGrath, W. D., "The Ultra-Violet Photolysis of Ozone in the Presence of Water Vapour," Planet. Space Sci. 19, 413 (1971)
- Langley, K. F., and McGrath, W. D., "The Ultra-Violet Photolysis of Ozone in the Presence of Molecular Oxygen," Planet. Space Sci. 19, 416 (1971)
- Lebedew, P., "Die Grenzwerte der kürzesten akustischen Wellen," Ann. Physik [4] 35, 171 (1911)
- LeBlanc, F. J., Oldenberg, O., and Carleton, N. P., "Transition Probabilities of Forbidden Oxygen Lines in a Discharge Tube," J. Chem. Phys. 45, 2200 (1966)
- Livesey, J. B., Roberts, A. L., and Williams, A., "The Formation of Oxides of Nitrogen in some Oxy-Propane Flames," Combust. Sci. Technol. 4, 9 (1971)
- Loewenstein, M., "Relative Quenching Rates of $O(^1D)$ by CO_2 , N_2 , and O_2 ," J. Chem. Phys. 54, 2282 (1971)
- Losev, S. A., and Smekhov, G. D., "Excitation Time of the $B^3\Pi_g$ State of N_2 at High Temperatures," Opt. Spectr. (URSS) 22, 484 (1967)
- Lukasik, S. J., and Young, J. E., "Vibrational Relaxation Times in Nitrogen," J. Chem. Phys. 27, 1149 (1957)
- McCoubrey, J. C., Milward, R. C., and Ubbelohde, A. R., "Transition Probabilities for the Transfer of Vibrational Energy," Trans. Faraday Soc. 57, 1472 (1961)
- McCumb, J. L., and Kaufman, F., "Kinetics of the $O + O_3$ Reaction," J. Chem. Phys. 57, 1270 (1972); see also U. Pittsburgh Space Research Coordination Center, Report No. 160 (1971)
- McCullough, D. W., and McGrath, W. D., "The Collisional Deactivation of $O(^1D)$ Atoms by Molecular Oxygen," Chem. Phys. Ltrs. 8, 353 (1971)
- McCullough, D. W., and McGrath, W. D., "The Production of Vibrationally-Excited Oxygen Molecules in the Reactions of $O(^1D)$ Atoms with Molecular Oxygen and Ozone," Chem. Phys. Ltrs. 12, 98 (1971)
- McNeal, R. J., and Cook, G. R., "Decomposition of Ozone by Metastable $O_2(a^1\Delta_g)$," Trans. Am. Geophys. Union 48, 73 (1967)

- McNeal, R. J., and Durana, S. C., "Absolute Chemiluminescent Reaction Rates for Emission of the θ_2 Herzberg Bands in Oxygen and Oxygen-Inert-Gas Afterglows," J. Chem. Phys. 51, 2955 (1969)
- Mahenc, J., Bes, R., and Lacoste, G., "Le Produit Tension-Fréquence, Paramètre Fondamental de la Décomposition des Oxydes d'Azote dans un Champ Électrique Alternatif," Compt. Rend. Acad. Sci., Paris, C 269, 665 (1969)
- Mahenc, J., Clot, G., and Bes, R., "Application de la Technique de l'Effluveur à l'Étude de la Cinétique d'Oxydation du Monoxyde d'Azote," Bull. Soc. Chim. France 1578 (1971)
- Mahenc, J., Khemiri, H. E., and Bes, R., "Décomposition du Protoxyde d'Azote dans un Champ Électrique Alternatif," Compt. Rend. Acad. Sci., Paris, C 272, 345 (1971)
- Manning, W. M., and Noyes, W. A., Jr., "Photochemical Studies. XIV. The Decomposition of Nitrous Oxide Sensitized by Mercury Vapor," J. Am. Chem. Soc. 54, 3907 (1932)
- March, R. E., Furnival, S. G., and Schiff, H. I., "The Production of Electronically Excited Oxygen Molecules and their Reactions with Ozone," Photochem. Photobiol. 4, 971 (1965)
- Mathias, A., and Schiff, H. I., "Role of Excited Molecules in a Stream of Electrically Discharged Oxygen," J. Chem. Phys. 40, 3118 (1964)
- Melton, L. A., and Klemperer, "Vibrational Relaxation of Excited Electronic States: $\text{NO } A^2\Sigma^+$," J. Chem. Phys. 55, 1468 (1971)
- Mentall, J. E., Krause, H. F., and Fite, W. L., "Transfer of Excitation Energy from Nitrogen Molecules to Sodium Atoms," Discussions Faraday Soc. 44, 157 (1967)
- Meyer, E., and Sessler, G., "Schallausbreitung in Gasen bei hohen Frequenzen und sehr niedrigen Drucken," Z. Physik 149, 15 (1957)
- Meyer, J. A., Klosterboer, D. H., and Setser, D. W., "Energy Transfer Reactions of $\text{N}_2(A^3\Sigma_u^+)$. IV. Measurement of the Radiative Lifetime and Study of the Interaction with Olefins and Other Molecules," J. Chem. Phys. 55, 2084 (1971)
- Meyer, J. A., Setser, D. W., and Stedman, D. H., "Excitation of the Auroral Green Line of Atomic Oxygen ($^1\Sigma \rightarrow ^1D$) by $\text{N}_2(A^3\Sigma_u^+)$," Astrophys. J. 157, 1023 (1969)
- Meyer, J. A., Setser, D. W., and Stedman, D. H., "Energy Transfer Reactions of $\text{N}_2(A^3\Sigma_u^+)$. II. Quenching and Emission by Oxygen and Nitrogen Atoms," J. Phys. Chem. 74, 2238 (1970)

- Michael, J. V., "Thermal Decomposition of Ozone," J. Chem. Phys. 54, 4455 (1971)
- Miyama, H., and Endoh, R., "Vibrational Relaxation of Nitrogen in Shock-Heated $\text{NH}_3\text{-O}_2\text{-N}_2$ Mixtures," J. Chem. Phys. 46, 2011 (1967)
- Mlodziejewski, A., "Messungen der Schallgeschwindigkeit für Töne von 10 000 bis 33 000 Schwingungen pro Sekunde," Fortschr. Physik 66, 200 (1911)
- Mokhtar, M., and Richardson, E. G., "Supersonic Dispersion in Gases. II. Air Containing Water Vapour," Proc. Roy. Soc. (London), A 184, 117 (1945)
- Monk, R. G., "Thermal Relaxation in Humid Air," J. Acoust. Soc. Am. 46, 580 (1969)
- Moore, C. B., "Laser Studies of Vibrational Energy Transfer," Accounts Chem. Res. 2, 103 (1969)
- Moore, C. B., Wood, R. E., Hu, B.-L., and Yardley, J. T., "Vibrational Energy Transfer in CO_2 Lasers," J. Chem. Phys. 46, 4222 (1967)
- Morgan, J. E., and Schiff, H. I., "The Study of Vibrationally Excited N_2 Molecules with the Aid of an Isothermal Calorimeter," Can. J. Chem. 41, 903 (1963)
- Murphy, R. F., "The Ultraviolet Photolysis of the Nitrogen Oxides," Ph.D Thesis, Univ. of California, Los Angeles, 1969 (Univ. Microfilms, Inc., Ann Arbor, Mich., No. 70-14312)
- Myers, B. F., and Bartle, E. R., "Shock-Tube Study of the Radiative Processes in Systems Containing Atomic Oxygen and Carbon Monoxide at High Temperature," J. Chem. Phys. 47, 1783 (1967)
- Myers, B. F., and Bartle, E. R., "Shock-Tube Study of the Radiative Combination of Oxygen Atoms by Inverse Predissociation," J. Chem. Phys. 48, 3935 (1968)
- Myers, G. H., and O'Brien, R. J., "Quenching of $\text{O}_2(b^1\Sigma_g^+)$," Ann. N.Y. Acad. Sci. 171, 224 (1970)
- Neklepajev, N., "Über die Absorption kurzer akustischer Wellen in der Luft," Ann. Physik [4] 35, 175 (1911)
- Nikitin, E. E., "Nonadiabatic Vibrational Excitation of Molecules During Molecular Collisions," Opt. Spectr. (USSR) 9, 8 (1960); tr. of Opt. Spektrosk. 9, 16 (1960)

- Norrish, R. G. W., "Decomposition of Nitrogen Pentoxide,"
Nature 119, 123 (1927)
- Norrish, R. G. W., and Wayne, R. P., "The Photolysis of Ozone
by Ultraviolet Radiation. II. The Photolysis of Ozone
Mixed with Certain Hydrogen-Containing Substances,"
Proc. Roy. Soc. (London), A 288, 361 (1965)
- Norton, G. A., "Velocity of High Frequency Sound in Small
Tubes," J. Acoust. Soc. Am. 7, 16 (1935)
- Noxon, J. F., "Observation of the ($b^1\Sigma_g^+ - a^1\Delta_g$) Transition
in O_2 ," Can. J. Phys. 39, 1110 (1961)
- Noxon, J. F., "Optical Emission from $O(^1D)$ and $O_2(b^1\Sigma_g)$ in
Ultraviolet Photolysis of O_2 and CO_2 ," J. Chem. Phys. 52,
1852 (1970)
- Oberst, H., "Schallabsorption von Gasen im Kundtschen Rohr,
insbesondere bei Unterdruck. Der molekulare Anteil der
Absorption im Rohr," Akust. Z. 2, 76 (1937)
- O'Brien, E. F., and Robinson, G. W., "Computer Simulation
of the System N_2 in Fluid Argon-Correlation Functions
and Relaxation Times," Chem. Phys. Ltrs. 8, 79 (1971)
- O'Brien, R. J., Jr., and Myers, G. H., "Direct Flow
Measurement of $O_2(b^1\Sigma_g^+)$ Quenching Rates," J. Chem. Phys.
53, 3832 (1970)
- O'Brien, R. J., Jr., and Myers, G. H., "Oxygen- NO_2 Energy
Transfer," Chem. Phys. Ltrs. 2, 544 (1971)
- Ogryzlo, E. A., "Comments," [on: Zipf, E. C., "The
Collisional Deactivation of Metastable Atoms and Molecules
in the Upper Atmosphere," Can. J. Chem. 47, 1863 (1969)]
Can. J. Chem. 47, 1871 (1969)
- Ogryzlo, E. A., and Tang, C. W., "Quenching of Oxygen
($^1\Delta_g$) by Amines," J. Am. Chem. Soc. 92, 5034 (1970)
- Oldenberg, O., "A Short Duration Afterglow of Nitrogen;
Survey of Afterglows," Planet. Space Sci. 1, 40 (1959)
- Olmsted, J., III, Newton, A. S., and Street, K., Jr.,
"Determination of the Excitation Functions for Formation
of Metastable States of Some Rare Gases and Diatomic
Molecules by Electron Impact," J. Chem. Phys. 42, 2321
(1965)
- Olczyna, K. J., and Heicklen, J., "The Reaction of Ozone
with Carbon Disulfide," J. Phys. Chem. 74, 4188 (1970)

- Omholt, A., and Harang, L., "Measurements of the Mean Lifetime of the Metastable 1S -State of the Oxygen Atom in the Upper Atmosphere During Auroral Displays," J. Atmospheric Terrest. Phys. 7, 247 (1955)
- Paraskevopoulos, G., and Cvetanovic, R. J., "Competitive Reactions of the Excited Oxygen Atoms, $O(^1D)$," J. Am. Chem. Soc. 91, 7572 (1969)
- Paraskevopoulos, G., Preston, K. F., and Cvetanovic, R. J., "Relative Rate of Deactivation of $O(^1D_2)$ by Molecular Oxygen," J. Chem. Phys. 54, 3907 (1971)
- Parbrook, H. D., and Tempest, W., "Sound Absorption in Nitrogen and Oxygen," Acustica 8, 345 (1958)
- Parker, J. G., "Rotational and Vibrational Relaxation in Diatomic Gases," Phys. Fluids 2, 449 (1959)
- Parker, J. G., Adams, C. E., and Stavseth, R. M., "Absorption of Sound in Argon, Nitrogen, and Oxygen at Low Pressures," J. Acoust. Soc. Am. 25, 263 (1953)
- Parker, R. C., "The Smoke Method of Measuring Supersonic Velocities," Proc. Phys. Soc. (London) 49, 95 (1937)
- Parkinson, T. D., "Energy Transfer from $N_2(A^3\Sigma_u^+)$ as a Source of $O(^1S)$ in the Aurora," Planet. Space Sci. 18, 895 (1970)
- Pearson, E. B., "On the Behaviour of Suspended Particles in Air, and the Velocity of Sound at Super-Sonic Frequencies," Proc. Phys. Soc. (London) 47, 136 (1935)
- Penman, H. L., "The Effect of Temperature on Supersonic Dispersion in Gases," Proc. Phys. Soc. (London) 47, 543 (1935)
- Petralia, S., "Assorbimento di Ultrasuoni in Miscele di Gas Contenenti Idrogeno," Nuovo Cimento [10] 2, 241 (1955)
- Phillips, L. F., "The Lifetime of the $A^3\Sigma_u^+$ State of N_2 ," Can. J. Chem. 43, 369 (1965)
- Pielemeier, W. H., "The Pierce Acoustic Interferometer as an Instrument for the Determination of Velocity and Absorption," Phys. Rev. 34, 1184 (1929)
- Pielemeier, W. H., "Absorption and Velocity of High Frequency Sound in Oxygen," Phys. Rev. 35, 1417 (1930)
- Pielemeier, W. H., "Ultrasonic Velocity and Absorption in Oxygen," Phys. Rev. 36, 1005 (1930)

- Pielemeier, W. H., "Supersonic Satellites and Velocity," Phys. Rev. 38, 1236 (1931)
- Pielemeier, W. H., "1. Acoustical Detection of Purely Mechanical Vibrations in Quartz Plates, 2. Supersonic Dispersion in Air," Phys. Rev. 52, 244 (1937)
- Pielemeier, W. H., "Velocity of Sound in Air," J. Acoust. Soc. Am. 10, 313 (1939)
- Pierce, G. W., "Piezoelectric Crystal Oscillators Applied to the Precision Measurement of the Velocity of Sound in Air and CO_2 at High Frequencies," Proc. Am. Acad. Arts Sci. 60, 271 (1925)
- Pitts, J. N., Jr., "Singlet Molecular Oxygen and the Photochemistry of Urban Atmospheres," Ann. N.Y. Acad. Sci. 171, 239 (1970)
- Pitts, J. N., Jr., "The Role of Singlet Molecular Oxygen in the Chemistry of Urban Atmospheres," Proc. Symp. Chem. Reactions Urban Atmosp., C. S. Tuesday, Editor, (American Elsevier Publishing Co., New York, 1971) pg. 3
- Pitts, J. N., Jr., Khan, A. U., Smith, E. B., and Wayne, R. P., "Singlet Oxygen in the Environmental Sciences Singlet Molecular Oxygen and Photochemical Air Pollution," Environ. Sci. Technol. 3, 241 (1969)
- Pravilov, A. M., and Vilesov, F. I., "Deactivation and Reactions of Atomic Oxygen in the ^1D State," Russ. J. Phys. Chem. 45, 1018 (1971); tr. of Zh. Fiz. Khim. 45, 1795 (1971)
- Preston, K. F., and Cvetanović, R. J., "Collisional Deactivation of Excited Oxygen Atoms in the Photolysis of NO_2 at 2288 Å," J. Chem. Phys. 45, 2888 (1966)
- Prince, J. F., Collins, C. B., and Robertson, W. W., "Spectra Excited in an Argon Afterglow," J. Chem. Phys. 40, 2619 (1964)
- Pumper, E. J., "The Absorption of Ultrasonic Waves in Air and in Monoatomic Gases," J. Phys. (Acad. Sci. USSR, Moscow) 1, 411 (1939)
- Quick, L. M., and Cvetanović, R. J., "Production of $\text{O}(^1\text{D}_2)$ Atoms in the Photolysis of CO_2 at close to 1600 Å," Can. J. Chem. 49, 2193 (1971)
- Railston, W., and Richardson, E. G., "The Effect of Pressure on Supersonic Dispersion in Gases," Proc. Phys. Soc. (London) 47, 533 (1935)
- Raper, O. F., and DeMore, W. B., "Reaction of $\text{O}(^1\text{D})$ with CO ," J. Chem. Phys. 40, 1053 (1964)

- Redpath, A. E., and Menzinger, M., "Molecular Beam Chemiluminescence. I. Kinetic Energy Dependence of the $\text{NO} + \text{O}_3 \rightarrow \text{NO}_2^* + \text{O}_2$ Reaction," Can. J. Chem. 49, 3063 (1971)
- Reid, C. D., "Some Investigations into the Velocity of Sound at Ultra-Sonic Frequencies using Quartz Oscillators," Phys. Rev. 35, 814 (1930)
- Reid, C. D., "Notes on the Effect of Distance from the Source on the Velocity of Sound at Ultrasonic Frequencies," Phys. Rev. 37, 1147 (1931)
- Richardson, E. G., "Supersonic Dispersion in Gases," Proc. Roy. Soc. (London), A 146, 56 (1934)
- Rogers, H. H., "Absorption of Supersonic Waves in Mixtures of Air and Carbon Dioxide at Different Relative Humidities," Phys. Rev. 45, 208 (1934)
- Rosser, W. A., Jr., Wood, A. D., and Gerry, E. T., "Deactivation of Vibrationally Excited Carbon Dioxide (ν_3) by Collisions with Carbon Dioxide or with Nitrogen," J. Chem. Phys. 50, 4996 (1969)
- Roth, W., "Shock Tube Study of Vibrational Relaxation in the $\text{A } ^2\Sigma^+$ State of NO ," J. Chem. Phys. 34, 999 (1961)
- Roth, W., "Dependence of Vibrational Relaxation Time on the Vibrational Quantum Number. Experimental Verification for $\text{NO}(\text{A } ^2\Sigma^+)$ behind Shock Waves," J. Chem. Phys. 34, 2204 (1961)
- Sackett, P. B., and Yardley, J. T., "Short-Lived Fluorescence from Nitrogen Dioxide," Chem. Phys. Ltrs. 2, 612 (1971)
- Sato, Y., and Tsuchiya, S., "Inter- and Intra-Molecular Vibrational Energy Transfer in a $\text{CO}_2 - \text{N}_2$ System," Chem. Phys. Ltrs. 5, 293 (1970)
- Schiff, H. I., "Neutral Reactions Involving Oxygen and Nitrogen," Can. J. Chem. 47, 1903 (1969)
- Schilling, H. K., Givens, M. P., Nyborg, W. L., Pielemeier, W. A., and Thorpe, H. A., "Ultrasonic Propagation in Open Air," J. Acoust. Soc. Am. 19, 222 (1947)
- Schmidt, K., "Abklingung und Mechanismus der Lumineszenz von Gasen bei Anregung durch schnelle Elektronen," Z. Naturforsch. 11A, 1023 (1956)
- Schmidt Müller, N., "Schallabsorption in Gasen bei Frequenzen zwischen 20 und 100 kHz," Akust. Z. 3, 115 (1938)

- Schnaus, U. E., "Thermal Relaxation in Oxygen with CH₄ and CD₄ Admixtures," J. Acoust. Soc. Am. 37, 1 (1965)
- Schofield, K., "An Evaluation of Kinetic Rate Data for Reactions of Neutrals of Atmospheric Interest," Planet. Space Sci. 15, 643 (1967); Erratum: Planet. Space Sci. 15, 1336 (1967)
- Schultz, H. A., "Scintillations and Energy Transfer in Argon-Nitrogen Mixtures," J. Chem. Phys. 44, 377 (1966)
- Schulz, G. J., "Measurement of Excitation of N₂, CO, and He by Electron Impact," Phys. Rev. 116, 1141 (1959)
- Schulz, G. J., "Vibrational Excitation of Nitrogen by Electron Impact," Phys. Rev. 125, 229 (1962)
- Schulz, G. J., "Vibrational Excitation of N₂, CO, and H₂ by Electron Impact," Phys. Rev. A 135, 988 (1964)
- Schwartz, S. E., "Kinetics of Nitrogen Dioxide Fluorescence," Diss. Abstr. B 30, 1073 (1969)
- Schweikert, G., "Bestimmung der Schallgeschwindigkeit und des Verhältnisses der spezifischen Wärmen der Gase nach der Methode der Kundtschen Staubfiguren," Ann. Physik [4] 48, 593 (1915)
- Scott, P. M., Preston, K. F., Andersen, R. J., and Quick, L. M., "The Reaction of the Electronically Excited Oxygen Atom O(¹D₂) with Nitrous Oxide," Can. J. Chem. 49, 1808 (1971)
- Seaton, M. J., "Excitation Processes in the Aurora and Airglow. 2. Excitation of Forbidden Atomic Lines in High Latitude Aurorae," J. Atmospheric Terrest. Phys. 4, 295 (1954)
- Seaton, M. J., "The Calculation of Cross-sections for Excitation of Forbidden Atomic Lines by Electron Impact," J. Atmospheric Terrest. Phys. special supplement 5, 289 (1955)
- Seaton, M. J., "Oxygen Red Lines in the Airglow. II. Collisional Deactivation Effects," Astrophys. J. 127, 67 (1958)
- Sessler, G., "Schallabsorption und Schalldispersion in gasförmigem Stickstoff und Sauerstoff bei hohen Frequenz/Druck-Werten," Acustica 8, 395 (1958)
- Setser, D. W., and Thrush, B. A., "Kinetics of Reactions Involving CN Emission. II. The Reaction Between Oxygen Atoms and Cyanogen," Proc. Roy. Soc. (London), A 288, 275 (1965)

- Sharma, R. D., and Brau, C. A., "Near-Resonant Vibrational Energy Transfer in N_2 - CO_2 Mixtures," *Phys. Rev. Lett.* 19, 1273 (1967)
- Sharma, R. D., and Brau, C. A., "Energy Transfer in Near-Resonant Molecular Collisions due to Long-Range Forces with Application to Transfer of Vibrational Energy from ν_3 Mode of CO_2 to N_2 ," *J. Chem. Phys.* 50, 924 (1969)
- Sharma, H. D., Jervis, R. E., and Wong, K. Y., "Isotopic Exchange Reactions in Nitrogen Oxides," *J. Phys. Chem.* 74, 923 (1970)
- Shemansky, D. E., " N_2 Vegard-Kaplan System in Absorption," *J. Chem. Phys.* 51, 689 (1969)
- Shemansky, D. E., and Carleton, N. P., "Lifetime of the N_2 Vegard-Kaplan System," *J. Chem. Phys.* 51, 682 (1969)
- Shields, F. D., and Lee, K. P., "Thermal Relaxation Processes in Gases," *J. Acoust. Soc. Am.* 35, 1909 (1963)
- Shilling, W. G., "Measurements of the Velocity of Sound in Steam, Nitrous Oxide, and Carbon Dioxide, with Special Reference to the Temperature Coefficient of the Molecular Heats," *Phil. Mag. S. [7]* 3, 273 (1927)
- Shui, V. H., Appleton, J. P., and Keck, J. C., "The Three-Body Recombination and Dissociation of Diatomic Molecules: A Comparison between Theory and Experiment," *Symp. Combust.*, 13th (Combustion Institute, Pittsburgh, 1971) 21
- Sidebottom, H. W., Otsuka, K., Horowitz, A., Calvert, J. G., Rabe, B. R., and Damon, E. K., "Vibronic Effects in the Decay of the Fluorescence Excited in SO_2 and NO_2 ," *Chem. Phys. Lett.* 13, 337 (1972)
- Simonaitis, R., and Heicklen, J., "The Mercury-Sensitized Oxidation of Carbon Monoxide," *Intern. J. Chem. Kinetics* 3, 319 (1971)
- Sinness, L. S., and Roseveare, W. E., "The Dispersion of Sound in Oxygen," *J. Chem. Phys.* 4, 427 (1936)
- Sivian, L. J., "High Frequency Absorption in Air and Other Gases," *J. Acoust. Soc. Am.* 19, 914 (1947)
- Slanger, T. G., and Black, G., "The CO_2 Photolysis Problem," *J. Chem. Phys.* 54, 1889 (1971)
- Slobodskaya, P. V., and Tkachenko, N. F., "Use of a Spectrophone to Determine the Relaxation Times of Vibrational States Corresponding to Absorption Bands of Nitrous Oxide," *Opt. Spectr.* 23, 256 (1967); *tr. of Opt. Spektr.* 23, 480 (1967)

- Smith, F. A., and Tempest, W., "Low-Frequency Sound Propagation in Gases," J. Acoust. Soc. Am. 33, 1626 (1961)
- Snelling, D. R., "Production of Singlet Oxygen in the Benzene Oxygen Photochemical System," Chem. Phys. Ltrs. 2, 346 (1968)
- Snelling, D. R., and Bair, E. J., "Deactivation of $\Theta(^1D)$ by Molecular Oxygen," J. Chem. Phys. 48, 5737 (1968)
- Snelling, D. R., and Gauthier, M., "Efficiency of $\Theta_2(^1\Sigma_g^+)$ Formation by $\Theta(^1D) + \Theta_2$," Chem. Phys. Ltrs. 9, 254 (1971)
- Stanley, C. R., "A New Phenomenon Associated with Active Nitrogen," Proc. Phys. Soc. (London), A 68, 709 (1955)
- Starr, W. L., "Excitation of Electronic Levels of Sodium by Vibrationally Excited Nitrogen," J. Chem. Phys. 43, 73 (1965)
- Starr, W. L., and Shaw, T. M., "Transfer of N_2 Vibrational Energy to Potassium," J. Chem. Phys. 44, 4181 (1966)
- Stedman, D. H., and Setser, D. W., "Energy Pooling by Triplet Nitrogen ($A^3\Sigma_u^+$) Molecules," J. Chem. Phys. 50, 2256 (1969)
- Steer, R. P., Ackerman, R. A., and Pitts, J. N., Jr., Singlet Oxygen in the Environmental Sciences. V. Rates of Deactivation of $\Theta_2(^1\Delta_g)$ by Oxygen and Nitrogen," J. Chem. Phys. 51, 843 (1969)
- Steer, R. P., Sprung, J. L., and Pitts, J. N., Jr., "Singlet Oxygen in the Environmental Sciences Evidence for the Production of $\Theta_2(^1\Delta_g)$ by Energy Transfer in the Gas Phase," Environ. Sci. Technol. 3, 946 (1969)
- Stephens, E. R., "Hydrocarbon Reactivities and Nitric Oxide Conversion in Real Atmospheres," Proc. Symp. Chem. Reactions Urban Atmosp., C. S. Tuesday, editor, (American Elsevier Publishing Co., New York 1971) pg. 45
- Stuhl, F., and Niki, H., "Absolute Rate Constants for the Quenching of $\Theta_2(b^1\Sigma_g^+)$ by Unsaturated Hydrocarbons," Chem. Phys. Ltrs. 5, 573 (1970)
- Stuhl, F., and Niki, H., "Kinetic Isotope Effects in the Quenching of $\Theta_2(b^1\Sigma_g^+)$ by Some Deuterated Compounds," Chem. Phys. Ltrs. 7, 473 (1970)
- Stuhl, F., and Niki, H., "Measurements of Rate Constants for Termolecular Reactions of $\Theta(^3P)$ with NO , Θ_2 , CO , N_2 , and CO_2 Using a Pulsed Vacuum-uv Photolysis-Chemiluminescent Method," J. Chem. Phys. 55, 3943 (1971)

- Stuhl, F., and Welge, K. H., "Deactivation of $\Theta(^1S)$ and $\Theta_2(b^1\Sigma_g^+)$," Can. J. Chem. 47, 1870 (1969)
- Sullivan, J. O., and Warneck, P., "Reactions of 1D Oxygen Atoms. III. Ozone Formation in the 1470-Å Photolysis of Θ_2 ," J. Chem. Phys. 46, 953 (1967)
- Tanaka, Y., and Jursa, A. S., "A New Method for Producing the Auroral Afterglow of Nitrogen and Its Spectrum," J. Opt. Soc. Am. 51, 1239 (1961)
- Taylor, R. L., and Bitterman, S., "Vibrational Energy Transfer in the CO_2 - N_2 Molecular System," Bull. Am. Phys. Soc. (II) 13, 1591 (1968)
- Taylor, R. L., and Bitterman, S., "Experimental Measurements of the Resonant Vibrational Energy Transfer between Mode ν_3 of CO_2 and N_2 ," J. Chem. Phys. 50, 1720 (1969)
- Taylor, R. L., and Bitterman, S., "Survey of Vibrational Relaxation Data for Processes Important in the CO_2 - N_2 Laser System," Rev. Mod. Phys. 41, 26 (1969)
- Taylor, R. L., Camac, M., and Feinberg, R. M., "Measurements of Vibration-Vibration Coupling in Gas Mixtures," Symp. Combust., 11th (Combustion Institute, Pittsburgh, 1967) 49
- Tempest, W., and Parbrook, H. D., "The Absorption of Sound in Argon, Nitrogen and Oxygen," Acustica 7, 354 (1957)
- Thaler, W. J., "The Absorption and Dispersion of Sound in Oxygen as a Function of the Frequency-Pressure Ratio," J. Acoust. Soc. Am. 24, 15 (1952)
- Thiesen, M., "Eine Bestimmung der Schallgeschwindigkeit in Luft von 0°," Annalen der Physik 25, 506 (1908)
- Tinti, D. S., and Robinson, G. W., "Spectroscopic Evidence for Slow Vibrational and Electronic Relaxation in Solids. The Vegard-Kaplan and Second Positive Systems of N_2 in Solid Rare Gases," J. Chem. Phys. 49, 3229 (1968)
- Tschuikow-Roux, E., "Some Energetics and the Kassel Fit Parameter s_k in Unimolecular Reactions," J. Phys. Chem. 73, 3891 (1969)
- Tsuchiya, S., "Emission and Absorption of the Sodium D-Line behind a Shock Wave in Argon, Nitrogen- and Carbon Monoxide-Argon Mixtures Containing a Trace of Sodium Vapor," Bull. Chem. Soc. Japan 37, 828 (1964)

- Vallance Jones, A., and Gattinger, R. L., "The Seasonal Variation and Excitation Mechanism of the 1.58μ $^1\Delta_g - ^3\Sigma_g^-$ Twilight Airglow Band," Planet. Space Sci. 11, 961 (1963)
- Vallance Jones, A., and Harrison, A. W., " $^1\Delta_g - ^3\Sigma_g^- - O_2$ Infrared Emission Band in the Twilight Airglow Spectrum," J. Atmospheric Terrest. Phys. 13, 45 (1958)
- Van Itterbeek, A., and Mariens, P., "Measurements with Ultra-Sonics on the Velocity and Absorption of Sound at Ordinary and at Low Temperatures," Physica 4, 207 (1937)
- Van Itterbeek, A., and Mariens, P., "Measurements on the Velocity and Absorption of Sound in Various Gases Between $+100^\circ C$ and $-100^\circ C$ - Influence of Pressure on the Absorption," Physica 4, 609 (1937)
- Van Itterbeek, A., and Thys, L., "Influence of a Magnetic Field on the Absorption of Sound in Oxygen Gas," Physica 5, 298 (1938)
- Van Itterbeek, A., and Thys, L., "Measurements on the Velocity and the Absorption of Sound in Gaseous Nitric Oxide in a Magnetic Field," Physica 5, 640 (1938)
- Van Itterbeek, A., and Van Paemel, O., "Measurements on the Velocity of Sound as a Function of Pressure in Oxygen Gas at Liquid Oxygen Temperatures. Calculation of the Second Virial Coefficient and the Specific Heats," Physica 5, 593 (1938)
- Vanpee, M., Hill, K. D., and Kineyko, W. R., "Absolute Rate Constant Measurements for the Radiative Combination of Atomic Oxygen with Nitric Oxide," AIAA Journal 9, 135 (1971)
- Vilesov, A., and Pravilov, A. M., "Reactions of Atomic Oxygen with Methane During the Gas-Phase Photolysis of an Oxygen-Methane Mixture at 1925-1550 Å," High Energy Chem. 4, 191 (1970); tr. of Khim. Vys. Energ. 4, 220 (1970)
- Vilesov, F. I., and Pravilov, A. M., "Photolysis of Molecular Oxygen and an Oxygen-Carbon Dioxide Mixture in the 1925-1550 Å Region," High Energy Chem. 4, 359 (1970); tr. of Khim. Vys. Energ. 4, 401 (1970)
- Vilesov, F. I., and Pravilov, A. M., "Gas-Phase Photolysis of the Oxygen-Methane Mixture. Effect of Oxygen, Helium, and Argon on the yield of Atomic Oxygen (3P) + Methane Reaction Products," High Energy Chem. 4, 475 (1970); tr. of Khim. Vys. Energ. 4, 525 (1970)
- von Ellenrieder, G., Castellano, E., and Schumacher, H. J., "The Kinetics and the Mechanism of the Photochemical Decomposition of Ozone with Light of 2537 Å Wavelength," Chem. Phys. Ltrs. 2, 152 (1971)

- von Ellenrieder, G., Castellano, E., and Schumacher, H. J.,
 "Die Kinetik und der Mechanismus des photochemischen
 Ozonzerfalls im Licht der Wellenlänge 2537 Å,"
 Z. Physik. Chem. [NF] 76, 240 (1971)
- Wagner, K. H., "Über das Nachleuchten von A, [sic: Ar] N₂ und N₂
 plus CH₄ nach Stossanregung durch Elektronenlawinen,"
 Z. Naturforsch. 19A, 716 (1964)
- Walker, J. C. G., "Electric Field Excitation of O₂(¹Δ_g) in
 Auroras," Planet. Space Sci. 18, 1043 (1970)
- Wallace, L., and Chamberlain, J. W., "Excitation of O₂
 Atmospheric Bands in the Aurora," Planet. Space Sci. 7,
 60 (1959)
- Wallace, L., and Huntten, D. M., "Dayglow of the Oxygen A
 Band," J. Geophys. Res. 73, 4813 (1968)
- Wallace, L., and McElroy, M. B., "The Visual Dayglow," Planet.
 Space Sci. 14, 677 (1966)
- Wark, D. O., and Mercer, D. M., "Absorption in the Atmosphere
 by the Oxygen 'A' Band," Appl. Opt. 4, 839 (1965)
- Wasserman, E., Kuck, V. J., Delavan, W. M., and Yager, W. A.,
 "Electron Paramagnetic Resonance of ¹Δ Oxygen Produced by
 Gas-Phase Photosensitization with Naphthalene Derivatives,"
 J. Am. Chem. Soc. 91, 1040 (1969)
- Wayne, R. P., "Photo-Chemiluminescent Emission in Ozone,"
 Photochem. Photobiol. 5, 889 (1966)
- Wayne, R. P., "The Photochemical Formation of Electronically
 Excited Oxygen Molecules in the Atmosphere," Quart. J. Roy.
 Meteorol. Soc. 93, 69 (1967)
- Wayne, R. P., "Singlet Molecular Oxygen," Advan. Photochem.
7, 311 (1969)
- Wayne, R. P., "Laboratory Studies on the Excitation and
 Deactivation of Singlet Molecular Oxygen," Ann. N. Y. Acad.
 Sci. 171, 199 (1970)
- Weinreb, M. P., and Mannella, G. G., "Quenching of N₂(A³Σ_u⁺)
 in High Vibrational Levels by Nitrogen Atoms," J. Chem.
 Phys. 50, 3129 (1969)
- Weinreb, M. P., and Mannella, G. G., "Effect of Oxygen in the
 Surface-Catalyzed Excitation of Nitrogen," J. Chem. Phys.
51, 4973 (1969)

- Weinstock, E. M., Zare, R. N., and Melton, L. A., "Lifetime Determination of the $\text{N}^{\circ}\text{A}^2\Sigma^+$ State," J. Chem. Phys. 56, 3456 (1972)
- Welge, K. H., Filseth, S., and Stuhl, F., "Untersuchung der Desaktivierung $\Theta(^1\text{S})$, $\Theta(^1\text{D})$ und $\Theta_2(\text{b}^1\Sigma_g^+)$ mittels Lebensdaueremessungen," Ber. Bunsenges. Physik. Chem. 73, 911 (1969)
- Welge, K. H., Zia, A., Vietzke, E., and Filseth, S. V., "Temperature Dependence of the Reaction $\Theta(^1\text{S}) + \text{CO}_2$," Chem. Phys. Ltrs. 10, 13 (1971)
- Wentink, T., Jr., and Isaacson, L., "Radiative Lifetimes in the N_2 Vegard-Kaplan System," J. Chem. Phys. 46, 822 (1967)
- White, D. R., "Vibrational Relaxation of N_2 in $\text{N}_2\text{-H}_2$ Mixtures," J. Chem. Phys. 46, 2016 (1967)
- White, D. R., "Vibrational Relaxation of Shocked $\text{N}_2\text{-He}$, $\text{N}_2\text{-CH}_4$, and $\text{N}_2\text{-C}_2\text{H}_2$ Mixtures," J. Chem. Phys. 48, 525 (1968)
- White, D. R., "Shock-Tube Study of Vibrational Exchange in $\text{N}_2\text{-}\Theta_2$ Mixtures," J. Chem. Phys. 49, 5472 (1968)
- Wight, H. M., "Vibrational Relaxation in $\text{N}_2\Theta\text{-H}_2\Theta$ and $\text{N}_2\Theta\text{-D}_2\Theta$ Mixtures," J. Acoust. Soc. Am. 28, 459 (1956)
- Winer, A. M., and Bayes, K. D., "The Decay of $\Theta_2(\text{a}^1\Delta)$ in Flow Experiments," J. Phys. Chem. 70, 302 (1966)
- Winter, T. G., and Hill, G. L., "High-Temperature Ultrasonic Measurements of Rotational Relaxation in Hydrogen, Deuterium, Nitrogen, and Oxygen," J. Acoust. Soc. Am. 42, 848 (1967)
- Wood, W. P., and Heicklen, J., "Kinetics and Mechanism of the Carbon Disulfide-Oxygen Explosion," J. Phys. Chem. 75, 861 (1971)
- Wray, K. L., "Shock-Tube Study of the Vibrational Relaxation of Nitric Oxide," J. Chem. Phys. 36, 2597 (1962)
- Wray, K. L., and Freeman, T. S., "Shock Front Structure in Θ_2 at High Mach Numbers," J. Chem. Phys. 40, 2785 (1964)
- Yamazaki, H., and Cvetanovic, R. J., "Collisional Deactivation of the Excited Singlet Oxygen Atoms and Their Insertion into the CH Bonds of Propane," J. Chem. Phys. 41, 3703 (1964)
- Yang, J. Y., and Servedio, F. M., "Photolysis of Nitrous Oxide at 1470 Å," J. Chem. Phys. 47, 4817 (1967)

- Yardley, J. T., "Vibration-to-Vibration Energy Transfer in Gas Mixtures Containing Nitrous Oxide," J. Chem. Phys. 49, 2816 (1968)
- Yardley, J. T., and Moore, C. B., "Vibration \rightarrow Vibration and Vibration \rightarrow Translation Energy Transfer in Methane-Oxygen Mixtures," J. Chem. Phys. 48, 14 (1968)
- Young, R. A., "Pressure Dependence of Some Infrared and Vacuum Ultraviolet Bands Occurring in Active Nitrogen," J. Chem. Phys. 33, 1112 (1960)
- Young, R. A., and Black, G., "Measurement of the Rate Coefficient of $\Theta_2(a^1\Delta) + \Theta_2(a^1\Delta) \rightarrow \Theta_2(b^1\Sigma) + \Theta_2(X^3\Sigma)$," J. Chem. Phys. 42, 3740 (1965)
- Young, R. A., and Black, G., "Excited-State Formation and Destruction in Mixtures of Atomic Oxygen and Nitrogen," J. Chem. Phys. 44, 3741 (1966)
- Young, R. A., and Black, G., "Deactivation of $\Theta(^1D)$," J. Chem. Phys. 47, 2311 (1967)
- Young, R. A., and Black, G., "Excitation of the Auroral Green Line in the Earth's Nightglow," Planet. Space Sci. 14, 113 (1966)
- Young, R. A., Black, G., and Slinger, T. G., "4000-8000-Å Emission from Far-Ultraviolet Photolysis of $N_2\Theta$, $N\Theta$, $N\Theta_2$, $C\Theta$, $C\Theta_2$, and Θ_2 ," J. Chem. Phys. 48, 2067 (1968)
- Young, R. A., Black, G., and Slinger, T. G., "Vacuum-Ultraviolet Photolysis of $N_2\Theta$. I. Metastable Species Produced at 1470 Å," J. Chem. Phys. 49, 4769 (1968)
- Young, R. A., and Sharpless, R. L., "Chemiluminescent Reactions Involving Atomic Oxygen and Nitrogen," J. Chem. Phys. 39, 1071 (1963)
- Young, R. A., and Sharpless, R. L., "Excitation of the Θ_2 Bands in the Nightglow," J. Geophys. Res. 67, 3871 (1962)
- Young, R. A., and St. John, G. A., "Reactions of $N_2(A^3\Sigma_u^+)$," Advances in Chemistry Series (Am. Chem. Soc. Washington) 80, 105 (1969)
- Young, R. A., and Ung, A. Y.-M., "Optical Studies of the Photolysis of $C\Theta_2$ at 1470 Å," J. Chem. Phys. 44, 3038 (1966)
- Zartman, I. F., "Ultrasonic Velocities and Absorption in Gases at Low Pressures," J. Acoust. Soc. Am. 21, 171 (1949)

- Zelikoff, M., and Aschenbrand, L. M., "Vacuum Ultraviolet Photochemistry. Part V. Nitrous Oxide at 1236 Å," J. Chem. Phys. 27, 123 (1957)
- Zipf, E. C., Jr., "Erratum: A Measurement of the Diffusion Coefficient and Radiative Lifetime of Nitrogen Molecules in the A $^3\Sigma_u^+$ State," J. Chem. Phys. 39, 3534 (1963); erratum to: J. Chem. Phys. 38, 2034 (1963)
- Zipf, E. C., Jr., "Afterglow Studies on the Deactivation of the Metastable A $^3\Sigma_u^+$ State of Nitrogen," Bull. Am. Phys. Soc. (II) 9, 185 (1964)
- Zipf, E. C., Jr., "Metastable-Metastable Collisions in Nitrogen," Bull. Am. Phys. Soc. (II) 10, 179 (1965)
- Zipf, E. C., "The Collisional Deactivation of Metastable Atoms and Molecules in the Upper Atmosphere," Can. J. Chem. 47, 1863 (1969)
- Zmuda, A. J., "Dispersion of Velocity and Anomalous Absorption of Ultrasonics in Nitrogen," J. Acoust. Soc. Am. 23, 472 (1951)

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