

NATL INST. OF STAND & TECH



A11107 263285



UNITED STATES
DEPARTMENT OF
COMMERCE
NATIONAL BUREAU OF STANDARDS



NBS SPECIAL PUBLICATION 381

National Bureau of Standards
Library, E-01 Admin. Bldg.

OCT 1 1981

191021

SPC
100
457

Bibliography of Ion-Molecule Reaction Rate Data

(January 1950-October 1971)

C
O
67
581
13
2

U.S.
DEPARTMENT
OF
COMMERCE

National
Bureau
of
Standards

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards¹ was established by an act of Congress March 3, 1901. The Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the Nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau consists of the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Center for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of a Center for Radiation Research, an Office of Measurement Services and the following divisions:

Applied Mathematics — Electricity — Mechanics — Heat — Optical Physics — Linac Radiation² — Nuclear Radiation² — Applied Radiation² — Quantum Electronics³ — Electromagnetics³ — Time and Frequency³ — Laboratory Astrophysics³ — Cryogenics³.

THE INSTITUTE FOR MATERIALS RESEARCH conducts materials research leading to improved methods of measurement, standards, and data on the properties of well-characterized materials needed by industry, commerce, educational institutions, and Government; provides advisory and research services to other Government agencies; and develops, produces, and distributes standard reference materials. The Institute consists of the Office of Standard Reference Materials and the following divisions:

Analytical Chemistry—Polymers—Metallurgy—Inorganic Materials—Reactor Radiation—Physical Chemistry.

THE INSTITUTE FOR APPLIED TECHNOLOGY provides technical services to promote the use of available technology and to facilitate technological innovation in industry and Government; cooperates with public and private organizations leading to the development of technological standards (including mandatory safety standards), codes and methods of test; and provides technical advice and services to Government agencies upon request. The Institute also monitors NBS engineering standards activities and provides liaison between NBS and national and international engineering standards bodies. The Institute consists of a Center for Building Technology and the following divisions and offices:

Engineering and Product Standards—Weights and Measures—Invention and Innovation—Product Evaluation Technology—Electronic Technology—Technical Analysis—Measurement Engineering—Building Standards and Code Services⁴—Housing Technology⁴—Federal Building Technology⁴—Structures, Materials and Life Safety⁴—Building Environment⁴—Technical Evaluation and Application⁴—Fire Technology.

THE INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY conducts research and provides technical services designed to aid Government agencies in improving cost effectiveness in the conduct of their programs through the selection, acquisition, and effective utilization of automatic data processing equipment; and serves as the principal focus within the executive branch for the development of Federal standards for automatic data processing equipment, techniques, and computer languages. The Center consists of the following offices and divisions:

Information Processing Standards—Computer Information—Computer Services—Systems Development—Information Processing Technology.

THE OFFICE FOR INFORMATION PROGRAMS promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal Government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System; provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world, and directs the public information activities of the Bureau. The Office consists of the following organizational units:

Office of Standard Reference Data—Office of Technical Information and Publications—Library—Office of International Relations.

¹ Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

² Part of the Center for Radiation Research.

³ Located at Boulder, Colorado 80302.

⁴ Part of the Center for Building Technology.

APR 29 1974

Bibliography of Ion-Molecule Reaction Rate Data (January 1950-October 1971)

George A. Sinnott

Laboratory Astrophysics Division
Institute for Basic Standards
National Bureau of Standards
Boulder, Colorado 80302



U.S. DEPARTMENT OF COMMERCE, Frederick B. Dent, Secretary
NATIONAL BUREAU OF STANDARDS, Richard W. Roberts, Director

Issued October 1973

Library of Congress Catalog Card Number: 73-600085

National Bureau of Standards Special Publication 381

Nat. Bur. Stand. (U.S.), Spec. Publ. 381, 73 pages (Oct. 1973)

CODEN: XNBSAV

Foreword

The National Standard Reference Data System was established in 1963 for the purpose of promoting the critical evaluation and dissemination of numerical data of the physical sciences. The program is coordinated by the Office of Standard Reference Data of the National Bureau of Standards but involves the efforts of many groups in universities, government laboratories, and private industry. The primary aim of the program is to provide compilations of critically evaluated physical and chemical property data. These tables are published in the *Journal of Physical and Chemical Reference Data*, in the NSRDS-NBS series of the National Bureau of Standards, and through other appropriate channels.

The task of critical evaluation is carried out in various data centers, each with a well-defined technical scope. A necessary preliminary step to the critical evaluation process is the retrieval from the world scientific literature of all papers falling within the scope of the center. Each center, therefore, builds up a comprehensive well-indexed bibliographical file which forms the base for the evaluation task. Bibliographies derived from these files are published when they appear to be of value to research workers and others interested in the particular technical area.

Further information on NSRDS and the publications which form the primary output of the program may be obtained by writing to the Office of Standard Reference Data, National Bureau of Standards, Washington, DC 20234.

David R. Lide, Jr., Chief
Office of Standard Reference Data

Contents

	Page
Foreword	iii
Introduction	v
Reaction equations	1
Citation list	39
Author index	61

Bibliography of Ion-Molecule Reaction Rate Data

(January 1950—October 1971)

George Sinnott*

A bibliography is presented of papers in the open literature that contain original experimental data on ion-molecule reaction rates or cross sections. Positive and negative ion-molecule and ion-ion reactions are included by not electron impact processes. For papers to be included, the reactants must have been identified and data for kinetic energies below 10 electron volts must have been presented.

Key words: Atoms; bibliography; cross-sections; ions; molecules; rate coefficients; reactions.

Introduction

This bibliography is an updating of the bibliography published in August 1969 as Joint Institute for Laboratory Astrophysics (JILA) Information Center Report No. 9. The present version includes references (available as of 1 October 1971) to papers reporting measurements of ion-molecule reaction rates for atoms and simple molecules. The bibliography is intended to be of particular interest to workers in the field of aeronomy, as well as to investigators of ion-molecule processes.

References were obtained by a search of the open, published literature for papers containing original *experimental* data on ion-molecule reaction cross sections or rate constants. In particular, the processes included are: charge exchange between positive or negative ions and neutral molecules or atoms; heavy particle exchange between positive or negative ions and neutral molecules or atoms; reaction of excited neutrals with neutrals to create ionized species; and ion-ion reactions. Electron collision processes were excluded, as these are covered in another bibliography already compiled at the JILA Information Center. Papers presenting cross section data are listed only if the kinetic energies of the molecules or atoms were 10 electron volts or less. All atomic species are included. The molecules selected are those considered to be of potential interest to

aeronomists, astrophysicists, and plasma physicists. In particular, no attempt has been made to include heavy organic molecules. Papers are included only if they identify the reactant species; the right-hand side of the entry equation is left blank if the product species are not identified. The neutral products were omitted from the reaction equations.

The searching procedure began with a title search of *Science Abstracts*, Series A, *Physics Abstracts* from 1960 to the cut-off date, plus scanning the bibliographies of published relevant reviews. Papers found in this way were read to obtain references to other papers purporting to contain data.

Finally, the following journals were searched for recent papers:

Physical Review A

Physical Review Letters

Journal of Chemical Physics

Journal of Geophysical Research (blue and green)

Planetary and Space Science

The bibliography is organized in three sections, each keyed to the citation number of the individual references. These citation numbers are arbitrary designators used for internal organization of the JILA Information Center master bibliography. The same number is always coupled to any single reference, and may appear in more than one bibliography compiled at JILA. Consequently, not all numbers appear in any specialized bibliography, and in particular, the sequence of citation numbers listed here has gaps.

*Present address: Fire Technology Division, Institute for Applied Technology, National Bureau of Standards, Washington, D.C. 20234.

¹Kieffer, L. J., Bibliography of Low Energy Electron Collision Cross Section Data, Nat. Bur. Stand. (U.S.), Misc. Publ. 289, 95 pages (March 1967).

The first section is a listing of reaction equations with associated citation numbers, plus the name of the first author and the year of publication. The equations are divided into six major categories:

Two Body, Positive Ion—Negative Ion

Two Body, Positive Ion—Neutral

Two Body, Negative Ion—Neutral

Two Body, Excited Neutral—Neutral

Three Body, Postive—Neutral—Neutral

Three Body, Negative—Neutral—Neutral.

Within each category, reaction equations are listed in accordance with the following rules for the rank of the reacting species:

1. Positive ion; then negative ion; then excited neutral; then ground state neutral.
2. Within each class in (1) above, species are ranked by largest Z-number atom in ascending order of Z-number. Where two species have the same largest Z-number atom, they are further ordered by Z-number of the remaining atoms.

These rules would lead, for example, to the following order: +O, H-, N, O, CO, COH₂, NO, O₂, CO₂.

Each reaction equation is written with the reacting (and product) species ordered by increasing rank. The equations themselves are listed in rank order of the first species; for identical first species in order of the second species, etc.

The second section lists the full references in order of their citation numbers.

The third section is an alphabetical author index with citation numbers. All authors of each paper are included.

It should be kept in mind that inclusion of a reference in this bibliography does not imply a value judgment about the accuracy of the information. The only criteria for selection were that the reference reports a measurement of a cross section or reaction rate and that the reactant species are identified.

The author would like to acknowledge the help, encouragement and philosophical perspective received from Dr. Lee Kieffer throughout this project.

Reaction Equations

Two Body, Positive Ion–Negative Ion

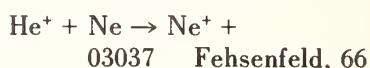
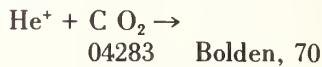
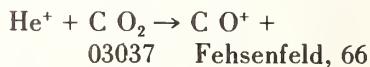
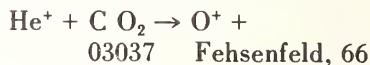
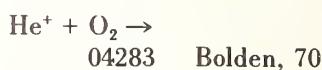
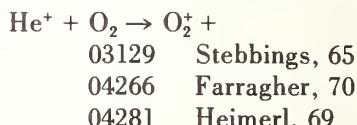
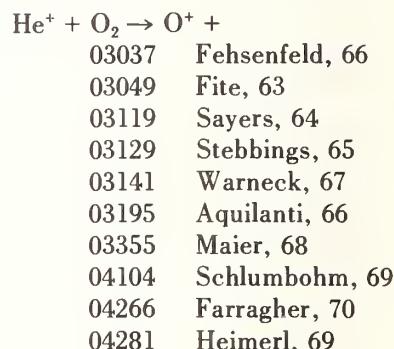
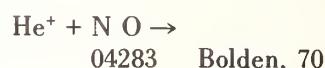
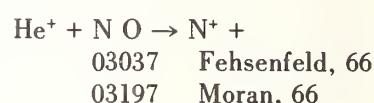
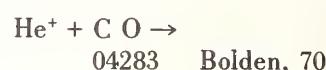
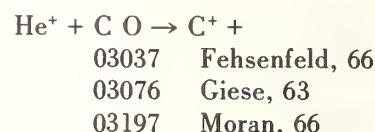
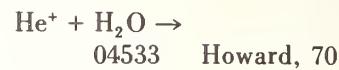
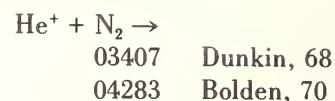
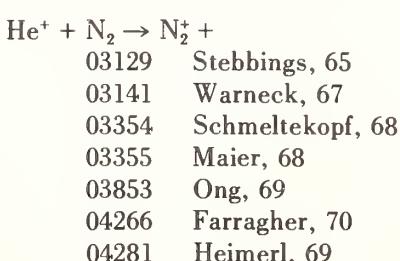
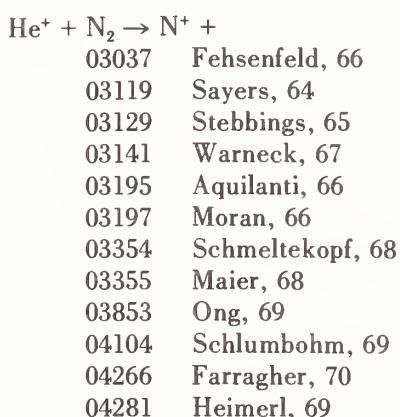
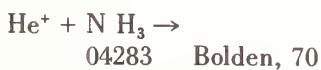
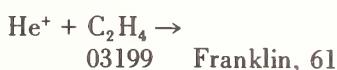
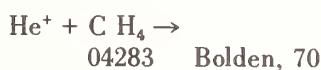
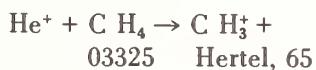
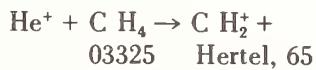
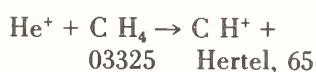
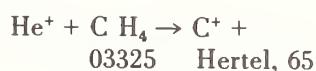
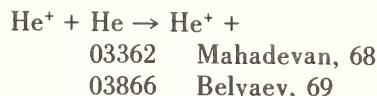
$H^+ + H^- \rightarrow$	
04274	Moseley, 70
04569	Peterson, 71
$C_6H_6^+ + S F_6^- \rightarrow$	
03145	Carlton, 64
$N^+ + O^- \rightarrow$	
02978	Aberth, 68
04273	Aberth, 70
04569	Peterson, 71
$N_2^+ + O_2^- \rightarrow$	
04273	Aberth, 70
04569	Peterson, 71
$O^+ + O^- \rightarrow$	
04569	Peterson, 71
$N O^+ + N O_2^- \rightarrow$	
04567	Eisner, 71
04569	Peterson, 71
$N O^+ + N O_3^- \rightarrow$	
04567	Eisner, 71
$N O^+ + S F_6^- \rightarrow$	
03145	Carlton, 64
$O_2^+ + O_2^- \rightarrow$	
04273	Aberth, 70
04569	Peterson, 71
$O_2^+ + N O_2^- \rightarrow$	
04569	Peterson, 71
$Na^+ + O^- \rightarrow$	
04286	Weiner, 70
$I^+ + I^- \rightarrow$	
03081	Greaves, 64
$Cs^+ + F^- \rightarrow Cs^+ + e^-$	
04279	Mandl, 70
$Tl^+ + Cl^- \rightarrow$	
03047	Fisk, 67
$Tl^+ + Br^- \rightarrow$	
03047	Fisk, 67
$Tl^+ + I^- \rightarrow$	
03047	Fisk, 67

Two Body, Positive Ion–Neutral

$H^+ + H \rightarrow H^+ +$	
03369	Belyaev, 67
$H_2^+ + H_2 \rightarrow H^+ +$	
03140	Vance, 66
03619	Yamane, 68
03632	Moran, 68
$H_2^+ + H_2 \rightarrow H_2^+ +$	
03140	Vance, 66
03149	Cramer, 61
03632	Moran, 68
$H_2^+ + H_2 \rightarrow H_3^+ +$	
03029	Chupka, 68
03072	Reuben, 62
03077	Giese, 63
03082	Gutbier, 57
03091	Ryan, 65
03107	Saporoschenko, 65
03113	Neynaber, 68
03116	Ortenburger, 60
03140	Vance, 66
03142	Weingartshofer, 64
03193	Warneck, 67
03198	Kubose, 63
03221	Harrison, 66
03619	Yamane, 68
03632	Moran, 68
03864	Bowers, 69
$H_2^+ + He \rightarrow He H^+ +$	
03077	Giese, 63
03116	Ortenburger, 60
03330	Von Koch, 63
03635	Chupka, 68
$H_2^+ + C D_4 \rightarrow H_2 D^+ +$	
03109	Munson, 63
$H_2^+ + N_2 \rightarrow N_2 H^+ +$	
04102	Bowers, 69
$H_2^+ + O_2 \rightarrow O_2 H^+ +$	
03120	Schissler, 56
03367	Foner, 62
$H_2^+ + Ne \rightarrow Ne H^+ +$	
03091	Ryan, 65
03106	Moran, 63
03635	Chupka, 68

$H_2^+ + Ar \rightarrow Ar H^+ +$		$H_3^+ + H_2 O \rightarrow H_3 O^+ +$	
03635 Chupka, 68		04248 Burt, 70	
04102 Bowers, 69			
$H_2^+ + Ar \rightarrow H^+ +$		$H_3^+ + C O \rightarrow H C O^+ +$	
03632 Moran, 68		04248 Burt, 70	
$H_3^+ + He \rightarrow He H^+ +$		$H_3^+ + N O \rightarrow H N O^+ +$	
03097 Aquilanti, 65		04248 Burt, 70	
$H_3^+ + C H_4 \rightarrow C H_5^+ +$		$H_3^+ + N_2 O \rightarrow H N_2 O^+ +$	
04248 Burt, 70		04248 Burt, 70	
$H_3^+ + C H_4 \rightarrow$		$H_3^+ + O_2 \rightarrow H O_2^+ +$	
03089 Aquilanti, 66		04248 Burt, 70	
$H_3^+ + C_2 H_2 \rightarrow C_2 H_3^+ +$		$H_3^+ + O_2 \rightarrow H_3 O_2^+$	
04248 Burt, 70		04248 Burt, 70	
$H_3^+ + C_2 H_2 \rightarrow$		$H_3^+ + C O_2 \rightarrow H C O_2^+ +$	
03095 Aquilanti, 66		04248 Burt, 70	
$H_3^+ + C_2 H_4 \rightarrow C_2 H_3^+ +$		$H_3^+ + N O_2 \rightarrow N O^+ +$	
04248 Burt, 70		04248 Burt, 70	
$H_3^+ + C_2 H_4 \rightarrow C_2 H_5^+ +$		$H_3^+ + N O_2 \rightarrow N O_2^+ +$	
04248 Burt, 70		04248 Burt, 70	
$H_3^+ + C_2 H_4 \rightarrow$		$H_3^+ + Ne \rightarrow Ne H^+ +$	
03095 Aquilanti, 66		03097 Aquilanti, 65	
$H_3^+ + C_2 H_6 \rightarrow C_2 H_5^+ +$		$H_3^+ + Ar \rightarrow Ar H^+ +$	
04248 Burt, 70		04102 Bowers, 69	
$H_3^+ + C_2 H_6 \rightarrow C_2 H_7^+ +$		$H_3^+ + Kr \rightarrow Kr H^+ +$	
04248 Burt, 70		03097 Aquilanti, 65	
$H_3^+ + C_2 H_6 \rightarrow$		$H_3^+ + Xe \rightarrow Xe H^+ +$	
03089 Aquilanti, 66		03097 Aquilanti, 65	
$H_3^+ + C_3 H_4 \rightarrow$		$D^+ + D \rightarrow D^+ +$	
03095 Aquilanti, 66		03369 Belyaev, 67	
$H_3^+ + C_3 H_6 \rightarrow$		$H D^+ + H D \rightarrow H_2 D^+ +$	
03095 Aquilanti, 66		03072 Reuben, 62	
$H_3^+ + C_3 H_8 \rightarrow$		03221 Harrison, 66	
03089 Aquilanti, 66		03864 Bowers, 69	
$H_3^+ + N H_3 \rightarrow N H_4^+ +$		$H D^+ + H D \rightarrow H D_2^+ +$	
04248 Burt, 70		03072 Reuben, 62	
$H_3^+ + N_2 \rightarrow N_2 H^+ +$		03221 Harrison, 66	
03097 Aquilanti, 65		03864 Bowers, 69	
04102 Bowers, 69		$H D^+ + N_2 \rightarrow N_2 H^+ +$	
04248 Burt, 70		04102 Bowers, 69	
$H D^+ + N_2 \rightarrow N_2 D^+ +$		$H D^+ + N_2 \rightarrow N_2 D^+ +$	
		04102 Bowers, 69	

$H D^+ + Ar \rightarrow Ar^+ +$	$D_2^+ + Ar \rightarrow Ar D^+ +$
03335 Berta, 64	03077 Giese, 63
$H D^+ + Ar \rightarrow Ar H^+ +$	03083 Harrison, 67
03335 Berta, 64	03364 Shannon, 65
04102 Bowers, 69	04102 Bowers, 69
$H D^+ + Ar \rightarrow Ar D^+ +$	$D_2^+ + As H_3 \rightarrow D_2 H^+ +$
03335 Berta, 64	03074 Giardini – Guidoni, 60
04102 Bowers, 69	
$D_2^+ + H_2 \rightarrow D_2 H^+ +$	$D_3^+ + C H_4 \rightarrow$
03198 Kubose, 63	03089 Aquilanti, 66
$D_2^+ + D_2 \rightarrow D_3^+ +$	$D_3^+ + C_2 H_2 \rightarrow$
03072 Reuben, 62	03095 Aquilanti, 66
03091 Ryan, 65	
03132 Stevenson, 55	$D_3^+ + C_2 H_4 \rightarrow$
03133 Stevenson, 58	03095 Aquilanti, 66
03221 Harrison, 66	$D_3^+ + C_2 H_6 \rightarrow$
03864 Bowers, 69	03089 Aquilanti, 66
$D_2^+ + D_2 \rightarrow D_3^+ +$	$D_3^+ + C_3 H_4 \rightarrow$
03198 Kubose, 63	03095 Aquilanti, 66
$D_2^+ + C H_4 \rightarrow D_2 H^+ +$	$D_3^+ + C_3 H_6 \rightarrow$
03109 Munson, 63	03095 Aquilanti, 66
$D_2^+ + C H_4 \rightarrow C H_4 D^+ +$	$D_3^+ + C_3 H_8 \rightarrow$
03084 Hand, 64	03089 Aquilanti, 66
$D_2^+ + N H_3 \rightarrow D_2 H^+ +$	$D_3^+ + N_2 \rightarrow N_2 D^+ +$
03074 Giardini – Guidoni, 60	04102 Bowers, 69
$D_2^+ + C H_3 C N \rightarrow C H_3 C N D^+ +$	$D_3^+ + Ar \rightarrow Ar D^+ +$
03083 Harrison, 67	04102 Bowers, 69
03364 Shannon, 65	
$D_2^+ + N_2 \rightarrow N_2 D^+ +$	$He^+ + H_2 \rightarrow H^+ +$
03077 Giese, 63	03079 Rozett, 68
04102 Bowers, 69	03153 Friedman, 65
$D_2^+ + C O \rightarrow C O D^+ +$	$He^+ + H_2 \rightarrow He H^+ +$
03083 Harrison, 67	03082 Gutbier, 57
03364 Shannon, 65	03097 Aquilanti, 65
$D_2^+ + O_2 \rightarrow O_2 D^+ +$	03116 Ortenburger, 60
03120 Schissler, 56	
$D_2^+ + C O_2 \rightarrow C O_2 D^+ +$	$He^+ + H_2 \rightarrow$
03083 Harrison, 67	03037 Fehsenfeld, 66
03364 Shannon, 65	04283 Bolden, 70
$D_2^+ + P H_3 \rightarrow D_2 H^+ +$	$He^+ + H D \rightarrow H^+ +$
03074 Giardini – Guidoni, 60	03079 Rozett, 68
	$He^+ + H D \rightarrow D^+ +$
	03079 Rozett, 68



$\text{He}^+ + \text{S F}_6 \rightarrow \text{S F}_3^+ +$		$\text{He}_2^+ + \text{Ar} \rightarrow \text{Ar}^+ +$	
04572	Fehsenfeld, 70	04289	Bohme, 7
$\text{He}^+ + \text{S F}_6 \rightarrow \text{S F}_4^+ +$		$\text{He}_2^+ + \text{Kr} \rightarrow \text{Kr}^+ +$	
04572	Fehsenfeld, 70	04289	Bohme, 70
$\text{He}^+ + \text{S F}_6 \rightarrow \text{S F}_5^+ +$		$\text{He}_2\text{H}^+ + \text{H}_2 \rightarrow$	
04572	Fehsenfeld, 70	04285	Adams, 70
$\text{He}^+ + \text{Ar} \rightarrow \text{Ar}^+ +$		$\text{C}^+ + \text{D}_2 \rightarrow \text{C D}^+ +$	
03037	Fehsenfeld, 66	03102	Maier, 67
03362	Mahadevan, 68		
$\text{He}^+ + \text{Ar} \rightarrow$		$\text{C}^+ + \text{C} \rightarrow \text{C}^+ +$	
04283	Bolden, 70	03866	Belyaev, 69
$\text{He}^+ + \text{Kr} \rightarrow$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C H}^+ +$	
04283	Bolden, 70	04264	Wilson, 70
$\text{He}^+ + \text{Xe} \rightarrow$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C H}_2^+ +$	
04283	Bolden, 70	04264	Wilson, 70
$\text{He H}^+ + \text{H}_2 \rightarrow$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C H}_3^+ +$	
04285	Adams, 70	04264	Wilson, 70
$\text{He H}_2^+ + \text{H}_2 \rightarrow$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C H}_4^+ +$	
04285	Adams, 70	04264	Wilson, 70
$\text{He}_2^+ + \text{H}_2 \rightarrow$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C}_2\text{H}^+ +$	
04285	Adams, 70	04264	Wilson, 70
$\text{He}_2^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C}_2\text{H}_2^+ +$	
03037	Fehsenfeld, 66	04264	Wilson, 70
04289	Bohme, 70		
$\text{He}_2^+ + \text{C O} \rightarrow \text{C O}^+ +$		$\text{C}^+ + \text{C H}_4 \rightarrow \text{C}_2\text{H}_3^+ +$	
04289	Bohme, 70	04264	Wilson, 70
$\text{He}_2^+ + \text{N O} \rightarrow \text{N O}^+ +$		$\text{C}^+ + \text{N}_2 \rightarrow \text{N}^+ +$	
04289	Bohme, 70	03634	Lao, 68
$\text{He}_2^+ + \text{O}_2 \rightarrow \text{O}^+ +$		$\text{C}^+ + \text{N}_2 \rightarrow \text{C N}^+ +$	
04289	Bohme, 70	03634	Lao, 68
$\text{He}_2^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$		$\text{C}^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$	
04289	Bohme, 70	03634	Lao, 68
$\text{He}_2^+ + \text{C O}_2 \rightarrow \text{O}^+ +$		$\text{C}^+ + \text{C O} \rightarrow \text{C}_2\text{O}^+ +$	
04289	Bohme, 70	03368	Saporoschenko, 68
$\text{He}_2^+ + \text{C O}_2 \rightarrow \text{C O}^+ +$		$\text{C}^+ + \text{O}_2 \rightarrow \text{O}^+ +$	
04289	Bohme, 70	03634	Lao, 68
$\text{He}_2^+ + \text{C O}_2 \rightarrow \text{C O}_2^+ +$		$\text{C}^+ + \text{O}_2 \rightarrow \text{C O}^+ +$	
04289	Bohme, 70	03040	Fehsenfeld, 66
$\text{He}_2^+ + \text{Ne} \rightarrow \text{Ne}^+ +$		03634	Lao, 68
03037	Fehsenfeld, 66		
04289	Bohme, 7	$\text{C}^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$	
		03634	Lao, 68

$C^+ + C O_2 \rightarrow C O^+$		$C^+ + C H_3Cl \rightarrow C H^+$	
03040 Fehsenfeld, 66		04294 Wilson, 70	
04267 Schildcrout, 70			
$C^+ + C O_2 \rightarrow$		$C^+ + C H_3Cl \rightarrow C H_2^+$	
04256 Schildcrout, 69		04294 Wilson, 70	
$C^+ + C H_3F \rightarrow C H^+$		$C^+ + C H_3Cl \rightarrow C H_3^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C H_2^+$		$C^+ + C H_3Cl \rightarrow C_2^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C H_3^+$		$C^+ + C H_3Cl \rightarrow C C H^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C_2^+$		$C^+ + C H_3Cl \rightarrow C C H_2^+$	
04294 Wilson, 70		04294 Wilson, 70	
$C^+ + C H_3F \rightarrow C_2H_2^+$		$C^+ + C H_3Cl \rightarrow C C H_3^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C_2H_3^+$		$C^+ + C H_3Cl \rightarrow C Cl^+$	
04294 Wilson, 70		04294 Wilson, 70	
$C^+ + C H_3F \rightarrow C_2$		$C^+ + C H_3Cl \rightarrow C H Cl^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C_2H_2^+$		$C^+ + C H_3Cl \rightarrow C H_2Cl^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C_2H_3^+$		$C^+ + C H_3Br \rightarrow C H^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C H F^+$		$C^+ + C H_3Br \rightarrow C H_2^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C H_2F^+$		$C^+ + C H_3Br \rightarrow C C H^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C H_3F^+$		$C^+ + C H_3Br \rightarrow C C H_2^+$	
04288 Sullivan, 70		04294 Wilson, 70	
04294 Wilson, 70			
$C^+ + C H_3F \rightarrow C_2H F^+$		$C^+ + C H_3Br \rightarrow C C H_3^+$	
04288 Sullivan, 70		04294 Wilson, 70	
$C^+ + S F_6 \rightarrow S F_5^+$		$C^+ + C H_3Br \rightarrow Br^+$	
04572 Fehsenfeld, 70		04294 Wilson, 70	
$C^+ + C H_3Br \rightarrow C Br^+$		$C^+ + C H_3Br \rightarrow C H Br^+$	
04294 Wilson, 70		04294 Wilson, 70	

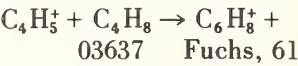
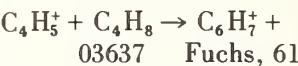
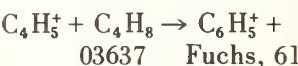
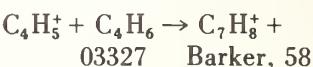
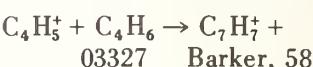
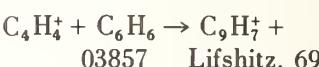
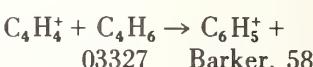
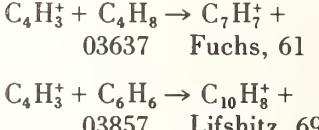
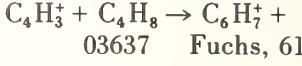
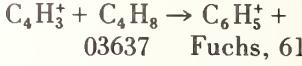
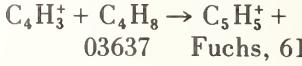
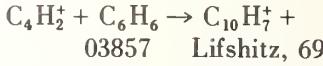
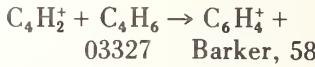
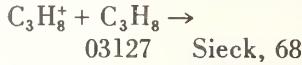
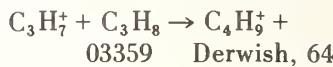
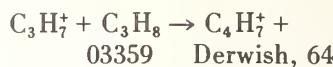
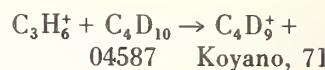
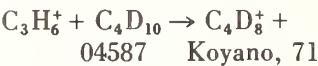
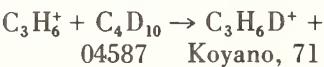
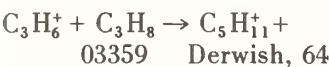
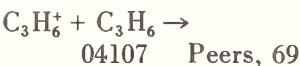
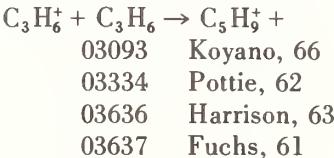
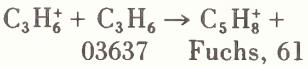
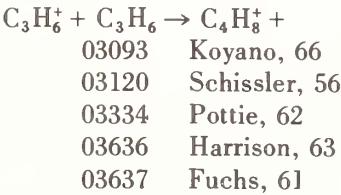
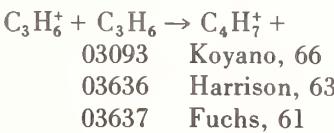
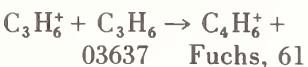
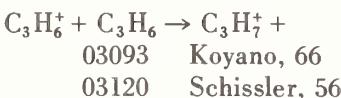
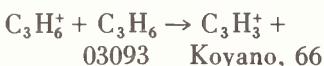
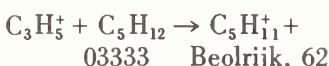
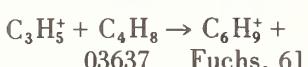
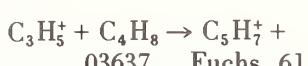
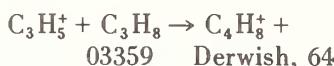
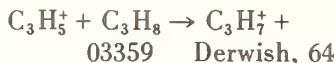
$C^+ + C H_3Br \rightarrow C H_2Br^+$		$C H_2^+ + D_2 \rightarrow$	
04294	Wilson, 70	03109	Munson, 63
$C^+ + C H_3Br \rightarrow C H_3Br^+$		$C H_2^+ + C H_4 \rightarrow C H_3^+$	
04294	Wilson, 70	03031	Derwisch, 64
$C^+ + C H_3I \rightarrow C H^+$		$C H_2^+ + C H_4 \rightarrow C_2H_2^+$	
04294	Wilson, 70	03637	Fuchs, 61
$C^+ + C H_3I \rightarrow C H_2^+$		$C H_2^+ + C H_4 \rightarrow C_2H_3^+$	
04294	Wilson, 70	03031	Derwisch, 64
$C^+ + C H_3I \rightarrow C H_3^+$		03637	Fuchs, 61
04294	Wilson, 70		
$C^+ + C H_3I \rightarrow C C^+$		$C H_2^+ + C H_4 \rightarrow$	
04294	Wilson, 70	03223	Wexler, 62
$C^+ + C H_3I \rightarrow C C H^+$		$C H_3^+ + D_2 \rightarrow$	
04294	Wilson, 70	03109	Munson, 63
$C^+ + C H_3I \rightarrow C C H_2^+$		$C H_3^+ + C H_4 \rightarrow C H_4^+$	
04294	Wilson, 70	03031	Derwisch, 64
$C^+ + C H_3I \rightarrow C C H_3^+$		$C H_3^+ + C H_4 \rightarrow C_2H_3^+$	
04294	Wilson, 70	03637	Fuchs, 61
$C^+ + C H_3I \rightarrow I^+$		$C H_3^+ + C H_4 \rightarrow C_2H_5^+$	
04294	Wilson, 70	03031	Derwisch, 64
$C^+ + C H_3I \rightarrow C H_3I^+$		03104	Melton, 64
04294	Wilson, 70	03120	Schissler, 56
$C H^+ + H_2 \rightarrow C H_2^+$		03200	Field, 57
03109	Munson, 63	03421	Field, 56
$C H^+ + D_2 \rightarrow$		03637	Fuchs, 61
03109	Munson, 63	03858	Durden, 69
$C H^+ + C H_4 \rightarrow$		03861	Fluegge, 69
03223	Wexler, 62		
$C H^+ + C_2H_2 \rightarrow C_3H^+$		$C H_3^+ + C H_4 \rightarrow$	
03031	Derwisch, 64	03223	Wexler, 62
$C H^+ + C_2H_2 \rightarrow C_3H_2^+$		$C H_3^+ + C_3H_8 \rightarrow C_3H_7^+$	
03327	Barker, 58	03359	Derwisch, 64
03637	Fuchs, 61		
$C H^+ + C_2H_2 \rightarrow C_3H_2^+$		$C H_3^+ + N H_3 \rightarrow H_4C N^+$	
03152	Field, 57	04603	Huntress, 70
03327	Barker, 58		
03637	Fuchs, 61		
$C H_2^+ + H_2 \rightarrow C H_2^+$		$C H_3^+ + H_2S \rightarrow C H S^+$	
03109	Munson, 63	03189	Field, 58
$C H_2^+ + H_2 \rightarrow C H_3^+$		$C H_3^+ + H_2S \rightarrow C H_3S^+$	
03109	Munson, 63	03189	Field, 58
$C H_4^+ + H_2 \rightarrow C H_5^+$		$C H_4^+ + H_2 \rightarrow C H_5^+$	
03109	Munson, 63	03109	Munson, 63
$C H_4^+ + D_2 \rightarrow C H_3D^+$		$C H_4^+ + D_2 \rightarrow C H_4D^+$	
03109	Munson, 63	03109	Munson, 63

$C H_4^+ + D_2 \rightarrow C H_3 D_2^+ +$		$C H_3 D^+ + C H_3 D \rightarrow C H_4 D^+ +$	
03109 Munson, 63		03221 Harrison, 66	
$C H_4^+ + C H_4 \rightarrow C H_5^+ + C H_3$		03423 Gupta, 67	
03075 Giardini - Guidoni, 60		$C H_3 D^+ + C H_3 D \rightarrow C H_3 D_2^+ +$	
$C H_4^+ + C H_4 \rightarrow C H_5^+ + C H_3$		03221 Harrison, 66	
03031 Derwish, 64		03423 Gupta, 67	
03075 Giardini - Guidoni, 60		03862 Buttrill, 69	
03091 Ryan, 65		$C H_2 D_2^+ + C H_2 D_2 \rightarrow C H_3 D_2^+ +$	
03092 Ryan, 66		03221 Harrison, 66	
03104 Melton, 64		03423 Gupta, 67	
03124 Shannon, 67		03862 Buttrill, 69	
03134 Talrose, 60		$C H_2 D_2^+ + C H_2 D_2 \rightarrow C H_2 D_3^+ +$	
03146 Colgate, 66		03221 Harrison, 66	
03189 Field, 58		03423 Gupta, 67	
03200 Field, 57		03862 Buttrill, 69	
03221 Harrison, 66		$C D_3^+ + H_2 \rightarrow$	
03226 Hand, 64		03109 Munson, 63	
03421 Field, 56		$C D_3^+ + C D_4 \rightarrow C_2 D_5^+ +$	
03423 Gupta, 67		03120 Schissler, 56	
03858 Durden, 69		$C D_3^+ + C D_4 \rightarrow C_2 D_5^+ +$	
03861 Fluegge, 69		03198 Kubose, 63	
03862 Buttrill, 69		$C H D_3^+ + C H D_3 \rightarrow C H_2 D_3^+ +$	
04295 Ryan, 70		03221 Harrison, 66	
$C H_4^+ + C H_4 \rightarrow C_2 H_7^+ +$		03423 Gupta, 67	
03031 Derwish, 64		$C H D_3^+ + C H D_3 \rightarrow C H D_4^+ +$	
$C H_4^+ + C H_4 \rightarrow$		03221 Harrison, 66	
03223 Wexler, 62		03423 Gupta, 67	
$C H_4^+ + C_2 H_2 \rightarrow C_3 H_3^+ +$		$C D_4^+ + C D_4 \rightarrow C D_5^+ +$	
03327 Barker, 58		03125 Shannon, 67	
$C H_4^+ + H_2 S \rightarrow C H S^+ +$		03132 Stevenson, 55	
03189 Field, 58		03189 Field, 58	
$C H_4^+ + H_2 S \rightarrow C H_3 S^+ +$		03198 Kubose, 63	
03189 Field, 58		03221 Harrison, 66	
$C H_4^+ + H Cl \rightarrow C H_5^+ +$		03423 Gupta, 67	
03189 Field, 58		$C D_4^+ + N_2 \rightarrow N_2 D^+ +$	
$C H_4^+ + Hg \rightarrow C H_2 Hg^+ +$		03083 Harrison, 67	
03201 Herman, 63		03125 Shannon, 67	
$C H_4^+ + Hg \rightarrow C H_3 Hg^+ +$		$C D_4^+ + C O \rightarrow C O D^+ +$	
03201 Herman, 63		03083 Harrison, 67	
$C H_5^+ + C H_4 \rightarrow$		03125 Shannon, 67	
03223 Wexler, 62		03221 Harrison, 66	
$C D^+ + H_2 \rightarrow$		$C D_4^+ + C O_2 \rightarrow C O_2 D^+ +$	
03109 Munson, 63		03083 Harrison, 67	
		03125 Shannon, 67	

$\text{C D}_4^+ + \text{H}_2\text{S} \rightarrow \text{C D}_4\text{H}^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_4\text{H}_3^+ +$	
03189	Field, 58	03104	Melton, 64
$\text{C D}_4^+ + \text{H Cl} \rightarrow \text{C D}_4\text{H}^+ +$		03152	Field, 57
03189	Field, 58	03327	Barker, 58
$\text{C}_2^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_4\text{H}^+ +$		03637	Fuchs, 61
03152	Field, 57	03862	Buttrill, 69
03327	Barker, 58		
03637	Fuchs, 61		
$\text{C}_2^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_2^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_3\text{H}_3^+ +$	
03200	Field, 57	03120	Schissler, 56
03421	Field, 56	03200	Field, 57
03636	Harrison, 63	03219	Field, 61
03637	Fuchs, 61	03421	Field, 56
$\text{C}_2^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_3^+ +$		03636	Harrison, 63
03636	Harrison, 63	03637	Fuchs, 61
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_2^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_5^+ +$	
03636	Harrison, 63	03200	Field, 57
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_3^+ +$		03219	Field, 61
03200	Field, 57	03421	Field, 56
03421	Field, 56	03636	Harrison, 63
03636	Harrison, 63	03637	Fuchs, 61
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_3^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_4\text{H}_6^+ +$	
03637	Fuchs, 61	03421	Field, 56
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_3\text{H}_3^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_4 \rightarrow$	
03031	Derwisch, 64	03200	Field, 57
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_4\text{H}_4^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_3\text{H}_3^+ +$	
03031	Derwisch, 64	03637	Fuchs, 61
$\text{C}_2\text{H}^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_4\text{H}_5^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_3\text{H}_5^+ +$	
03031	Derwisch, 64	03637	Fuchs, 61
$\text{C}_2\text{H}_2^+ + \text{C H}_4 \rightarrow \text{C}_2\text{H}_3^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_6 \rightarrow \text{C}_4\text{H}_7^+ +$	
03327	Barker, 58	03637	Fuchs, 61
$\text{C}_2\text{H}_2^+ + \text{C H}_4 \rightarrow \text{C}_3\text{H}_4^+ +$		$\text{C}_2\text{H}_2^+ + \text{C}_3\text{H}_6 \rightarrow \text{C}_4\text{H}_4^+ +$	
03327	Barker, 58	03334	Pottie, 62
$\text{C}_2\text{H}_2^+ + \text{C H}_4 \rightarrow$		$\text{C}_2\text{H}_2^+ + \text{C}_3\text{H}_6 \rightarrow \text{C}_5\text{H}_5^+ +$	
03223	Wexler, 62	03636	Harrison, 63
$\text{C}_2\text{H}_2^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_4\text{H}_2^+ +$		03637	Fuchs, 61
03104	Melton, 64		
03152	Field, 57	$\text{C}_2\text{H}_2^+ + \text{C}_3\text{H}_8 \rightarrow \text{C}_3\text{H}_7^+ +$	
03327	Barker, 58	03359	Derwisch, 64
03637	Fuchs, 61	$\text{C}_2\text{H}_2^+ + \text{C}_3\text{H}_8 \rightarrow \text{C}_3\text{H}_8^+ +$	
03862	Buttrill, 69	03359	Derwisch, 64
		$\text{C}_2\text{H}_3^+ + \text{C H}_4 \rightarrow$	
		03223	Wexler, 62
		$\text{C}_2\text{H}_3^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_4\text{H}_5^+ +$	
		04248	Burt, 70

$C_2H_3^+ + C_2H_4 \rightarrow C_2H_5^+$		$C_2H_4^+ + C H_4 \rightarrow$
03091 Ryan, 65		03223 Wexler, 62
03120 Schissler, 56		
03200 Field, 57	$C_2H_4^+ + C_2H_4 \rightarrow C_3H_5^+$	
03219 Field, 61	03120 Schissler, 56	
03421 Field, 56	03200 Field, 57	
04248 Burt, 70	03421 Field, 56	
	03636 Harrison, 63	
$C_2H_3^+ + C_2H_4 \rightarrow C_3H_3^+$		$C_2H_4^+ + C_2H_4 \rightarrow C_3H_5^+$
03120 Schissler, 56		03219 Field, 61
03636 Harrison, 63		04576 Goode, 70
$C_2H_3^+ + C_2H_4 \rightarrow C_3H_5^+$		$C_2H_4^+ + C_2H_4 \rightarrow C_4H_2^+$
04248 Burt, 70		03637 Fuchs, 61
$C_2H_3^+ + C_2H_4 \rightarrow C_4H_5^+$		04576 Goode, 70
03636 Harrison, 63		
$C_2H_3^+ + C_2H_6 \rightarrow C_3H_3^+$		$C_2H_4^+ + C_2H_4 \rightarrow C_4H_7^+$
03637 Fuchs, 61		03200 Field, 57
$C_2H_3^+ + C_2H_6 \rightarrow C_3H_4^+$		03219 Field, 61
03031 Derwisch, 64		03421 Field, 56
$C_2H_3^+ + C_2H_6 \rightarrow C_3H_5^+$		03636 Harrison, 63
03031 Derwisch, 64		03637 Fuchs, 61
03120 Schissler, 56		
03636 Harrison, 63		
$C_2H_3^+ + C_2H_6 \rightarrow C_4H_6^+$		$C_2H_4^+ + C_2H_4 \rightarrow C_4H_8^+$
03031 Derwisch, 64		03421 Field, 56
$C_2H_3^+ + C_2H_6 \rightarrow C_4H_7^+$		
03031 Derwisch, 64		$C_2H_4^+ + C_2H_4 \rightarrow$
03637 Fuchs, 61		03200 Field, 57
$C_2H_3^+ + C_3H_6 \rightarrow C_4H_5^+$		
03637 Fuchs, 61		$C_2H_4^+ + C_2H_6 \rightarrow C_3H_6^+$
		03637 Fuchs, 61
$C_2H_3^+ + C_3H_8 \rightarrow C_3H_5^+$		$C_2H_4^+ + C_2H_6 \rightarrow C_3H_7^+$
03359 Derwisch, 64		03359 Derwisch, 64
$C_2H_3^+ + C_3H_8 \rightarrow C_3H_7^+$		$C_2H_4^+ + C_3H_8 \rightarrow C_3H_8^+$
03359 Derwisch, 64		03359 Derwisch, 64
$C_2H_3^+ + C_3H_8 \rightarrow C_5H_7^+$		$C_2H_4^+ + C_3H_{12} \rightarrow C_5H_{11}^+$
03359 Derwisch, 64		03333 Beolrijk, 62
$C_2H_3^+ + C_4H_8 \rightarrow C_5H_5^+$		
03637 Fuchs, 61		$C_2H_4^+ + C_5H_{12} \rightarrow C_5H_{12}^+$
		03333 Beolrijk, 62
$C_2H_3^+ + C_6H_6 \rightarrow C_8H_7^+$		$C_2H_5^+ + C H_4 \rightarrow$
03857 Lifshitz, 69		03223 Wexler, 62

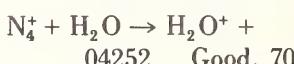
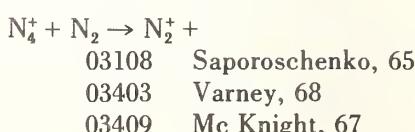
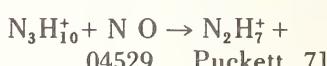
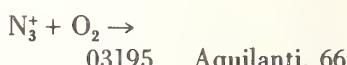
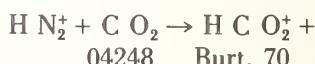
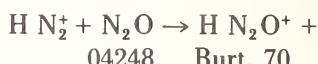
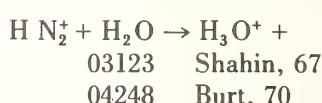
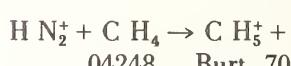
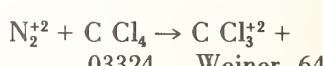
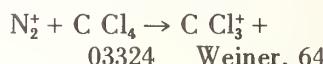
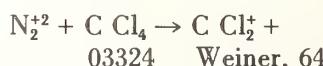
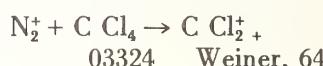
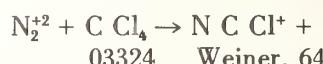
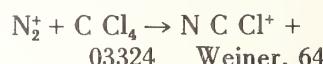
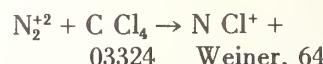
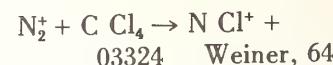
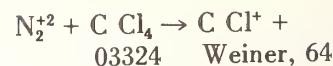
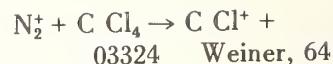
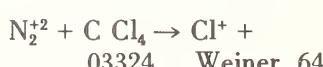
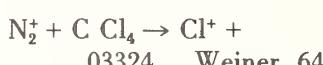
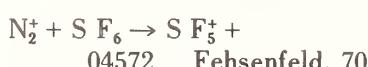
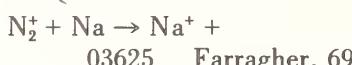
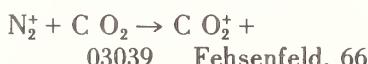
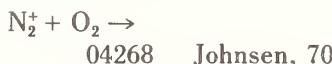
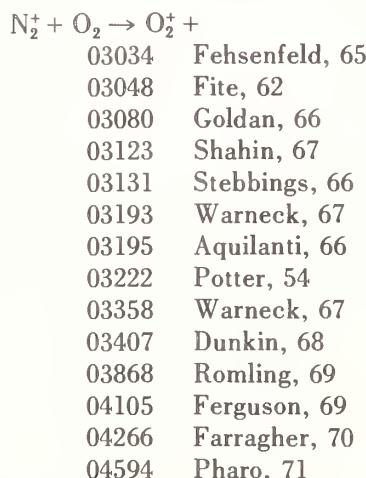
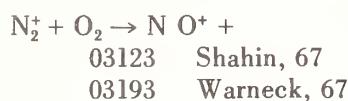
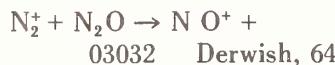
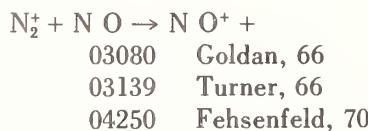
$C_2H_5^+ + C_2H_2 \rightarrow C_3H_3^+$		$C_3H_2^+ + C_4H_6 \rightarrow C_5H_5^+$	
04248	Burt, 70	03327	Barker, 58
$C_2H_5^+ + C_2H_2 \rightarrow C_4H_7^+$		$C_3H_3^+ + C_3H_6 \rightarrow C_4H_5^+$	
04248	Burt, 70	03334	Pottie, 62
$C_2H_5^+ + C_2H_4 \rightarrow C_3H_5^+$		03636	Harrison, 63
04248	Burt, 70	03637	Fuchs, 61
$C_2H_5^+ + C_2H_4 \rightarrow C_4H_9$		$C_3H_3^+ + C_3H_6 \rightarrow C_5H_5^+$	
04248	Burt, 70	03334	Pottie, 62
$C_2H_5^+ + C_2H_6 \rightarrow C_3H_6^+$		$C_3H_3^+ + C_3H_6 \rightarrow C_5H_6^+$	
03031	Derwish, 64	03334	Pottie, 62
$C_2H_5^+ + C_2H_6 \rightarrow C_3H_7^+$		$C_3H_3^+ + C_3H_6 \rightarrow C_6H_5^+$	
04248	Burt, 70	03334	Pottie, 62
$C_2H_5^+ + C_2H_6 \rightarrow C_4H_8^+$		$C_3H_3^+ + C_3H_6 \rightarrow C_6H_7^+$	
03031	Derwish, 64	03334	Pottie, 62
$C_2H_5^+ + C_2H_6 \rightarrow C_4H_9^+$		03637	Fuchs, 61
03031	Derwish, 64	$C_3H_3^+ + C_3H_8 \rightarrow C_3H_7^+$	
04248	Burt, 70	03359	Derwish, 64
$C_2H_5^+ + C_3H_8 \rightarrow C_3H_7^+$		$C_3H_3^+ + C_3H_8 \rightarrow C_4H_5^+$	
03359	Derwish, 64	03359	Derwish, 64
$C_2H_6^+ + C_4H_4 \rightarrow$		$C_3H_3^+ + C_3H_8 \rightarrow C_5H_9^+$	
03223	Wexler, 62	03359	Derwish, 64
$C_2H_6^+ + C_2H_6 \rightarrow C_2H_7^+$		$C_3H_3^+ + C_4H_6 \rightarrow C_7H_7^+$	
03031	Derwish, 64	03327	Barker, 58
$C_3H^+ + C_3H_6 \rightarrow C_4H_3^+$		$C_3H_3^+ + C_4H_6 \rightarrow C_7H_8^+$	
03334	Pottie, 62	03327	Barker, 58
03636	Harrison, 63	$C_3H_3^+ + C_4H_8 \rightarrow C_6H_8^+$	
03637	Fuchs, 61	03637	Fuchs, 61
$C_3H^+ + C_3H_6 \rightarrow C_4H_4^+$		$C_3H_4^+ + C_3H_6 \rightarrow C_4H_6^+$	
03636	Harrison, 63	03334	Pottie, 62
$C_3H_2^+ + C_3H_6 \rightarrow C_4H_2^+$		03636	Harrison, 63
03334	Pottie, 62	$C_3H_5^+ + C_2H_4 \rightarrow C_5H_9^+$	
$C_3H_2^+ + C_3H_6 \rightarrow C_4H_3^+$		04248	Burt, 70
03636	Harrison, 63	$C_3H_5^+ + C_3H_6 \rightarrow C_4H_7^+$	
$C_3H_2^+ + C_3H_6 \rightarrow C_4H_4^+$		03120	Schissler, 56
03334	Pottie, 62	03334	Pottie, 62
03636	Harrison, 63	03636	Harrison, 63
$C_3H_2^+ + C_3H_6 \rightarrow C_5H_5^+$		$C_3H_5^+ + C_3H_6 \rightarrow C_5H_7^+$	
03636	Harrison, 63	03334	Pottie, 62
$C_3H_2^+ + C_3H_6 \rightarrow C_6H_5^+$		03636	Harrison, 63
03637	Fuchs, 61	03637	Fuchs, 61
$C_3H_5^+ + C_3H_6 \rightarrow C_6H_9^+$		$C_3H_5^+ + C_3H_6 \rightarrow C_6H_9^+$	
03334	Pottie, 62	03334	Pottie, 62
03637	Fuchs, 61	03637	Fuchs, 61



$C_4H_5^+ + C_4H_8 \rightarrow C_7H_7^+$	03637	Fuchs, 61	$C_4H_8^+ + C_4H_8 \rightarrow C_6H_{12}^+$	03637	Fuchs, 61
$C_4H_6^+ + C_4H_6 \rightarrow C_3H_3^+$	03093	Koyano, 66	$C_4H_8^+ + C_4H_8 \rightarrow$	03094	Koyano, 66
$C_4H_6^+ + C_4H_6 \rightarrow C_4H_5^+$	03093	Koyano, 66	$C_4H_8^+ +$	03127	Sieck, 68
$C_4H_6^+ + C_4H_6 \rightarrow C_4H_7^+$	03093	Koyano, 66	$C_4H_9^+ + C_2H_4 \rightarrow C_6H_9^+$	04248	Burt, 70
$C_4H_6^+ + C_4H_6 \rightarrow C_5H_6^+$	03093	Koyano, 66	$C_4H_9^+ + C_2H_4 \rightarrow C_6H_{11}^+$	04248	Burt, 70
	03104	Melton, 64	$C_4H_9^+ + C_2H_4 \rightarrow C_6H_{13}^+$	04248	Burt, 70
	03327	Barker, 58	$C_5H_3^+ + C_6H_6 \rightarrow C_{11}H_7^+$	03857	Lifshitz, 69
$C_4H_6^+ + C_4H_6 \rightarrow C_5H_7^+$	03093	Koyano, 66	$C_6H_4^+ + C_6H_6 \rightarrow C_{12}H_8^+$	03857	Lifshitz, 69
	03104	Melton, 64	$C_6H_4^+ + C_6H_6 \rightarrow C_{12}H_{10}^+$	03857	Lifshitz, 69
	03327	Barker, 58	$C_6H_5^+ + C_6H_6 \rightarrow C_{10}H_9^+$	03857	Lifshitz, 69
$C_4H_6^+ + C_4H_6 \rightarrow C_6H_6^+$	03104	Melton, 64	$C_6H_5^+ + C_6H_6 \rightarrow C_{12}H_9^+$	03857	Lifshitz, 69
	03327	Barker, 58	$C_6H_5^+ + C_6H_6 \rightarrow C_{12}H_{11}^+$	03857	Lifshitz, 69
$C_4H_6^+ + C_4H_6 \rightarrow C_6H_7^+$	03093	Koyano, 66	$N^+ + H_2 \rightarrow N H^+$	03043	Fehsenfeld, 67
	03104	Melton, 64	$N^+ + N \rightarrow N^+$	03866	Belyaev, 69
	03327	Barker, 58	$N^+ + N H_3 \rightarrow N_2H^+$	03366	Derwish, 63
$C_4H_6^+ + C_4H_6 \rightarrow C_7H_9^+$	03093	Koyano, 66	$N^+ + N_2 \rightarrow N_2^+$	03222	Potter, 54
	03104	Melton, 64		04595	Maier, 71
	03327	Barker, 58		04600	Murad, 70
$C_4H_7^+ + C_4H_8 \rightarrow C_5H_7^+$	03637	Fuchs, 61	$N^+ + N_2 \rightarrow N_3^+$	04252	Good, 70
$C_4H_7^+ + C_4H_8 \rightarrow C_6H_9^+$	03637	Fuchs, 61	$N^+ + H_2O \rightarrow H_2O^+$	03424	Turner, 68
$C_4H_8^+ + C_4H_8 \rightarrow C_5H_8^+$	03637	Fuchs, 61	$N^+ + C O \rightarrow C O^+$	03039	Fehsenfeld, 66
$C_4H_8^+ + C_4H_8 \rightarrow C_5H_{10}^+$	03637	Fuchs, 61			
$C_4H_8^+ + C_4H_8 \rightarrow C_6H_{11}^+$	03637	Fuchs, 61			

$N^+ + N O \rightarrow N O^+ +$		$N H^+ + N H_3 \rightarrow N_2 H^+ +$	
03080 Goldan, 66		03366 Derwish, 63	
03139 Turner, 66			
$N^+ + N_2 O \rightarrow N O^+ +$		$N H^+ + N H_3 \rightarrow N_2 H_2^+ +$	
03032 Derwish, 64		03366 Derwish, 63	
$N^+ + N_2 O \rightarrow$		$N H^+ + N H_3 \rightarrow N_2 H_3^+ +$	
04533 Howard, 70		03366 Derwish, 63	
$N^+ + O_2 \rightarrow N O^+ +$		$N H^+ + N_2 \rightarrow N_2 H^+ +$	
03048 Fite, 62		03043 Fehsenfeld, 67	
03080 Goldan, 66			
03131 Stebbings, 66		$N H_2^+ + H_2 \rightarrow N H_3 +$	
03195 Aquilanti, 66		03043 Fehsenfeld, 67	
03358 Warneck, 67			
$N^+ + O_2 \rightarrow O_2^+ +$		$N H_2^+ + N H_3 \rightarrow N H_3^+ +$	
03080 Goldan, 66		03366 Derwish, 63	
03131 Stebbings, 66		04390 Huntress, 71	
03195 Aquilanti, 66			
03222 Potter, 54		$N H_2^+ + N H_3 \rightarrow N H_4^+ +$	
03358 Warneck, 67		03423 Gupta, 67	
04594 Pharo, 71		04390 Huntress, 71	
$N^+ + O_2 \rightarrow$		$N H_2^+ + N H_3 \rightarrow N_2 H_3^+ +$	
03407 Dunkin, 68		03366 Derwish, 63	
04266 Farragher, 70		$N H_2^+ + N H_3 \rightarrow N_2 H_4^+ +$	
04268 Johnsen, 70		03366 Derwish, 63	
$N^+ + C O_2 \rightarrow C O_2^+ +$		$N H_2^+ + N H_3 \rightarrow$	
03039 Fehsenfeld, 66		04574 Ryan, 70	
$N^+ + S F_6 \rightarrow S F_5^+ +$		$N H_3^+ + D_2 \rightarrow N H_3 D^+ +$	
04572 Fehsenfeld, 70		03074 Giardini – Guidoni, 60	
$N^+ + C Cl_4 \rightarrow Cl^+ +$		$N H_3^+ + N H_3 \rightarrow N H_3^+ +$	
03324 Weiner, 64		04390 Huntress, 71	
$N^+ + C Cl_4 \rightarrow C Cl^+ +$		$N H_3^+ + N H_3 \rightarrow N H_4^+ +$	
03324 Weiner, 64		03028 Chupka, 68	
$N^+ + C Cl_4 \rightarrow N C Cl^+ +$		03074 Giardini – Guidoni, 60	
03324 Weiner, 64		03091 Ryan, 65	
$N^+ + C Cl_4 \rightarrow C Cl_2^+ +$		03225 Dorfman, 59	
03324 Weiner, 64		03366 Derwish, 63	
$N^+ + C Cl_4 \rightarrow C Cl_3^+ +$		03423 Gupta, 67	
03324 Weiner, 64		04390 Huntress, 71	
$N^+ + C Cl_4 \rightarrow C Cl_3^+ +$		$N H_3^+ + N H_3 \rightarrow N H_4^+ +$	
03324 Weiner, 64		04574 Ryan, 70	
$N H^+ + H_2 \rightarrow N H_2^+ +$		$N H_3^+ + H_2 O \rightarrow N H_4^+ +$	
03043 Fehsenfeld, 67		03028 Chupka, 68	

$\text{N H}_3^+ + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ +$	$\text{N}_2^+ + \text{D}_2 \rightarrow \text{N}_2\text{D}^+ +$
03028 Chupka, 68	03077 Giese, 63
$\text{H C N}^+ + \text{D}_2 \rightarrow \text{H C N D}^+ +$	03120 Schissler, 56
03103 Martin, 60	03138 Turner, 65
03198 Kubose, 63	03198 Kubose, 63
$\text{C}_2\text{H}_3\text{N}^+ + \text{H}_2 \rightarrow \text{C}_2\text{H}_4\text{N}^+ +$	03218 Homer, 64
03103 Martin, 60	03863 Bowers, 69
$\text{C}_2\text{H}_3\text{N}^+ + \text{D}_2 \rightarrow \text{C}_2\text{H}_3\text{D N}^+ +$	04102 Bowers, 69
03083 Harrison, 67	$\text{N}_2^+ + \text{C D}_4 \rightarrow \text{N}_2\text{D}^+ +$
03103 Martin, 60	03083 Harrison, 67
03364 Shannon, 65	03125 Shannon, 67
$\text{C}_2\text{H}_3\text{N}^+ + \text{C H}_4 \rightarrow \text{C}_2\text{H}_4\text{N}^+ +$	$\text{N}_2^+ + \text{N}_2 \rightarrow \text{N}^+ +$
03103 Martin, 60	03192 Maier, 67
$\text{C H}_3\text{C N}^+ + \text{C H}_3\text{C N} \rightarrow \text{C}_2\text{H}_4\text{N}^+ +$	04597 Maier, 71
03221 Harrison, 66	$\text{N}_2^+ + \text{N}_2 \rightarrow \text{N}^+ +$
03423 Gupta, 67	03196 Leventhal, 67
$\text{N}_2^+ + \text{H}_2 \rightarrow \text{H}^+ +$	03869 Ryan, 69
03140 Vance, 66	$\text{N}_2^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$
03140 Vance, 66	03099 Leventhal, 67
$\text{N}_2^+ + \text{H}_2 \rightarrow \text{H}_2^+ +$	03222 Potter, 54
03140 Vance, 66	03632 Moran, 68
$\text{N}_2^+ + \text{H}_2 \rightarrow \text{N}_2\text{H}^+ +$	03869 Ryan, 69
03043 Fehsenfeld, 67	$\text{N}_2^+ + \text{N}_2 \rightarrow \text{N}_3^+ +$
03048 Fite, 62	03108 Saporoschenko, 65
03082 Gutbier, 57	03150 Cress, 66
03097 Aquilanti, 65	03196 Leventhal, 67
03198 Kubose, 63	04597 Maier, 71
03863 Bowers, 69	$\text{N}_2^+ + \text{N}_2 \rightarrow \text{N}_4^+$
04102 Bowers, 69	03108 Saporoschenko, 65
$\text{N}_2^+ + \text{H D} \rightarrow \text{N}_2\text{H}^+ +$	$\text{N}_2^+ + \text{O} \rightarrow \text{O}^+ +$
03420 Henglein, 65	03078 Roth, 62
03863 Bowers, 69	$\text{N}_2^+ + \text{O} \rightarrow \text{N O}^+ +$
04102 Bowers, 69	03046 Fehsenfeld, 65
$\text{N}_2^+ + \text{H D} \rightarrow \text{N}_2\text{D}^+ +$	04250 Fehsenfeld, 70
03420 Henglein, 65	04594 Pharo, 71
03863 Bowers, 69	$\text{N}_2^+ + \text{H}_2\text{O} \rightarrow \text{N}_2\text{H}^+ +$
04102 Bowers, 69	03123 Shahin, 67
$\text{N}_2^+ + \text{H D} \rightarrow \text{N}_2\text{D}^+ +$	$\text{N}_2^+ + \text{H}_2\text{O} \rightarrow \text{H}_2\text{O}^+ +$
03420 Henglein, 65	03123 Shahin, 67
03863 Bowers, 69	03424 Turner, 68
04102 Bowers, 69	



$N_4^+ + O_2 \rightarrow O_2^+ +$		$O^+ + O_2 \rightarrow O_2^+ +$	
03123 Shahin, 67		02985 Bohme, 67	
03195 Aquilanti, 66		03036 Fehsenfeld, 65	
04568 Dunkin, 71		03048 Fite, 62	
$N_4H_3^+ + N H_3 \rightarrow N_3H_{10}^+ +$		03112 Nakshbandi, 67	
04529 Puckett, 71		03119 Sayers, 64	
$O^+ + H \rightarrow H^+ +$		03128 Smith, 68	
03130 Stebbings, 68		03131 Stebbings, 66	
$O^+ + H_2 \rightarrow O H^+ +$		03143 Batey, 65	
03043 Fehsenfeld, 67		03148 Copsey, 66	
$O^+ + N_2 \rightarrow N_2^+ +$		03195 Aquilanti, 66	
03131 Stebbings, 66		03222 Potter, 54	
03222 Potter, 54		03358 Warneck, 67	
$O^+ + N_2 \rightarrow N O^+ +$		03407 Dunkin, 68	
02985 Bohme, 67		04105 Ferguson, 69	
03112 Nakshbandi, 67		04291 Varney, 70	
03119 Sayers, 64		04594 Pharo, 71	
03122 Schmeltekopf, 67		$O^+ + C O_2 \rightarrow O_2^+ +$	
03131 Stebbings, 66		03038 Fehsenfeld, 66	
03135 Talrose, 62		03118 Paulson, 66	
03143 Batey, 65		03407 Dunkin, 68	
03148 Copsey, 66		$O^+ + C O_2 \rightarrow$	
03195 Aquilanti, 66		04256 Schildcrout, 69	
03354 Schmeltekopf, 68		04267 Schildcrout, 70	
03358 Warneck, 67		04268 Johnsen, 70	
03407 Dunkin, 68		04270 Kanomata, 69	
03425 Giese, 66		$O^+ + N O_2 \rightarrow N O_2^+ +$	
04105 Ferguson, 69		04532 Dunkin, 71	
04594 Pharo, 71		$O^+ + S F_6 \rightarrow S F_5^+ +$	
$O^+ + H_2O \rightarrow H_2O^+ +$		04572 Fehsenfeld, 70	
03424 Turner, 68		$O H^+ + H_2 \rightarrow H_2O^+ +$	
$O^+ + H_2O \rightarrow$		03043 Fehsenfeld, 67	
04533 Howard, 70		$O H^+ + H_2O \rightarrow H_3O^+ +$	
$O^+ + NO \rightarrow NO^+ +$		03360 Thynne, 66	
03080 Goldan, 66		03423 Gupta, 67	
03139 Turner, 66		03861 Fluegge, 69	
04532 Dunkin, 71		04295 Ryan, 70	
$O^+ + N_2O \rightarrow N_2O^+ +$		$O H^+ + O_2 \rightarrow O_2^+ +$	
03032 Derwish, 64		03043 Fehsenfeld, 67	
04532 Dunkin, 71		$O H^+ + Hg \rightarrow O Hg^+ +$	
$O^+ + N_2O \rightarrow O_2^+ +$		03201 Herman, 63	
03032 Derwish, 64		$H_2O^+ + H_2 \rightarrow H_3O^+ +$	
04532 Dunkin, 71		03043 Fehsenfeld, 67	
$H_2O^+ + D_2 \rightarrow H_2O D^+ +$			
03032 Derwish, 64		03198 Kubose, 63	

$H_2O^+ + H_2O \rightarrow H_3O^+ +$		$C O^+ + C D_4 \rightarrow C O D^+ +$	
03085 Henglein, 59		03083 Harrison, 67	
03091 Ryan, 65		03125 Shannon, 67	
03096 Lampe, 57		03221 Harrison, 66	
03123 Shahin, 67			
03134 Talrose, 60		$C O^+ + C O \rightarrow C^+ +$	
03201 Herman, 63		03196 Leventhal, 67	
03360 Thynne, 66		$C O^+ + C O \rightarrow C_2O^+ +$	
03423 Gupta, 67		03196 Leventhal, 67	
03424 Turner, 68		$C O^+ + C O \rightarrow C_2O_2^+$	
03861 Fluegge, 69		03368 Saporoschenko, 68	
04252 Good, 70			
04295 Ryan, 70			
$H_2O^+ + N O \rightarrow N O^+ +$		$C O^+ + O_2 \rightarrow O_2^+ +$	
03424 Turner, 68		03040 Fehsenfeld, 66	
$H_2O^+ + O_2 \rightarrow O_2^+ +$		04267 Schildcrout, 70	
03043 Fehsenfeld, 67		$C O^+ + C O_2 \rightarrow C O_2^+ +$	
03424 Turner, 68		03040 Fehsenfeld, 66	
$H_2O^+ + Hg \rightarrow O H Hg^+ +$		04267 Schildcrout, 70	
03201 Herman, 63			
$H_3O^+ + N O \rightarrow N O^+ +$		$C O^+ + C O_2 \rightarrow$	
03424 Turner, 68		04256 Schildcrout, 69	
$O D^+ + D_2O \rightarrow D_3O^+ +$		$C O^+ + Na \rightarrow C Na^+ +$	
03360 Thynne, 66		03086 Herman, 65	
03423 Gupta, 67		$C O^+ + S F_6 \rightarrow S F_5^+ +$	
$D_2O^+ + H_2 \rightarrow H D_2O^+ +$		04572 Fehsenfeld, 70	
03096 Lampe, 57			
03198 Kubose, 63		$C O^+ + K \rightarrow C K^+ +$	
$D_2O^+ + D_2O \rightarrow D_3O^+ +$		03086 Herman, 65	
03096 Lampe, 57		$C O^+ + K \rightarrow O K^+ +$	
03360 Thynne, 66		03086 Herman, 65	
03423 Gupta, 67		$C H O^+ + H_2O \rightarrow H_3O^+ +$	
$C O^+ + H_2 \rightarrow C O H^+ +$		03363 Pritchard, 68	
03043 Fehsenfeld, 67		$C H O^+ + C H_2O \rightarrow C H_2O H^+ +$	
03091 Ryan, 65		03363 Pritchard, 68	
03198 Kubose, 63		$C H O^+ + C_2H_4O \rightarrow C_2H_5O^+ +$	
$C O^+ + D_2 \rightarrow C O D^+ +$		03363 Pritchard, 68	
03083 Harrison, 67		$C H O^+ + C_2H_6O \rightarrow H_7C_2O^+ +$	
03084 Hand, 64		03363 Pritchard, 68	
03120 Schissler, 56		$C H O^+ + H C O_2C_2H_3 \rightarrow H_5C_3O_2^+ +$	
03198 Kubose, 63		03363 Pritchard, 68	
03364 Shannon, 65		$C H_2O^+ + C H_2O \rightarrow C H_2O H^+ +$	
		03363 Pritchard, 68	
		$C H_2O H^+ + C H_3O H \rightarrow C H_3O H_2^+ +$	
		03423 Gupta, 67	

$\text{C H}_3\text{O H}^+ + \text{C H}_3\text{O H} \rightarrow \text{C H}_3\text{O H}_2^+$		$\text{N O}^+ + \text{Ar} \rightarrow \text{N}^+$	
03120 Schissler, 56		04582 Tiernan, 70	
$\text{C H}_3\text{O H}^+ + \text{C H}_3\text{O H} \rightarrow \text{C H}_3\text{O H}^+$		$\text{N O}^+ + \text{Ar} \rightarrow \text{O}^+$	
03423 Gupta, 67		04582 Tiernan, 70	
$\text{C H}_3\text{O H}^+ + \text{C D}_3\text{O H} \rightarrow \text{C H}_3\text{O H}_2^+$		$\text{H N O}^+ + \text{N O} \rightarrow \text{N O}^+$	
03332 Theard, 62		04248 Burt, 70	
$\text{C D}_2\text{O H}^+ + \text{C D}_3\text{O H} \rightarrow \text{C D}_3\text{O H}_2^+$		$\text{N}_2\text{O}^+ + \text{H}_2 \rightarrow \text{N}_2\text{O H}^+$	
03423 Gupta, 67		03043 Fehsenfeld, 67	
$\text{C D}_3\text{O H}^+ + \text{C D}_3\text{O H} \rightarrow \text{C D}_3\text{O H}_2^+$		$\text{N}_2\text{O H}_3^+ + \text{N H}_3 \rightarrow \text{N H}_4^+$	
03332 Theard, 62		04529 Puckett, 71	
03423 Gupta, 67		$\text{O}_2^+ + \text{H}_2 \rightarrow \text{O}_2\text{H}^+$	
$\text{C D}_3\text{O H}^+ + \text{C D}_3\text{O H} \rightarrow \text{C D}_3\text{O H D}^+$		03082 Gutbier, 57	
03332 Theard, 62		03097 Aquilanti, 65	
03423 Gupta, 67		$\text{O}_2^+ + \text{H}_2 \rightarrow \text{O}_2\text{H}^+$	
		03198 Kubose, 63	
$\text{C}_2\text{H}_3\text{O}^+ + \text{Hg} \rightarrow \text{C H}_2\text{O Hg}^+$		$\text{O}_2^+ + \text{H}_2 \rightarrow$	
03086 Hernan, 65		03043 Fehsenfeld, 67	
$\text{C}_2\text{H}_4\text{O}^+ + \text{C}_2\text{H}_4\text{O} \rightarrow \text{C}_2\text{H}_5\text{O}^+$		$\text{O}_2^+ + \text{D}_2 \rightarrow \text{O}_2\text{D}^+$	
03363 Pritchard, 68		03198 Kubose, 63	
$\text{C}_2\text{H}_6\text{O}^+ + \text{C}_2\text{H}_6\text{O} \rightarrow \text{C}_2\text{H}_7\text{O}^+$		$\text{O}_2^+ + \text{N} \rightarrow \text{N O}^+$	
03221 Harrison, 66		03080 Goldan, 66	
03423 Gupta, 67		$\text{O}_2^+ + \text{N}_2 \rightarrow \text{N}_2^+$	
$\text{C}_2\text{H}_5\text{O H}^+ + \text{Hg} \rightarrow \text{C H}_3\text{O Hg}^+$		03222 Potter, 54	
03086 Herman, 65		04101 Ryan, 69	
$\text{C}_2\text{H}_5\text{O H}^+ + \text{Hg} \rightarrow \text{C}_2\text{H}_4\text{O Hg}^+$		$\text{O}_2^+ + \text{N}_2 \rightarrow \text{N O}^+$	
03086 Herman, 65		03123 Shahin, 67	
$\text{C}_2\text{D}_3\text{H}_3\text{O}^+ + \text{C}_2\text{D}_3\text{H}_3\text{O} \rightarrow \text{C}_2\text{D}_3\text{H}_4\text{O}^+$		03358 Warneck, 67	
03221 Harrison, 66		$\text{O}_2^+ + \text{N O} \rightarrow \text{N O}^+$	
$\text{C}_2\text{D}_3\text{H}_3\text{O}^+ + \text{C}_2\text{D}_3\text{H}_3\text{O} \rightarrow \text{C}_2\text{D}_4\text{H}_3\text{O}^+$		03080 Goldan, 66	
03221 Harrison, 66		03139 Turner, 66	
$\text{N O}^+ + \text{N O} \rightarrow \text{N}^+$		03358 Warneck, 67	
03632 Moran, 68		04250 Fehsenfeld, 70	
04582 Tiernan, 70		$\text{O}_2^+ + \text{N O} \rightarrow$	
$\text{N O}^+ + \text{N O} \rightarrow \text{O}^+$		04268 Johnsen, 70	
03632 Moran, 68		$\text{O}_2^+ + \text{O}_2 \rightarrow \text{O}^+$	
04582 Tiernan, 70		03632 Moran, 68	
$\text{N O}^+ + \text{Ne} \rightarrow \text{N}^+$		$\text{O}_2^+ + \text{O}_2 \rightarrow \text{O}_2^+$	
04582 Tiernan, 70		03222 Potter, 54	
$\text{N O}^+ + \text{Na} \rightarrow \text{Na}^+$		04291 Varney, 70	
03625 Farragher, 69		$\text{O}_2^+ + \text{O}_2 \rightarrow \text{O}_3^+$	
$\text{N O}^+ + \text{S F}_6 \rightarrow \text{S F}_5^+$		03196 Leventhal, 67	
04572 Fehsenfeld, 70			

$O_2^+ + Ne \rightarrow O^+ +$		$N O_2^+ + N O \rightarrow N O^+ +$	
04582	Tiernan, 70	03967	Fehsenfeld, 69
$O_2^+ + Na \rightarrow Na^+ +$		$H_2N O_2^+ + N H_3 \rightarrow N H_4^+ +$	
03625	Farragher, 69	04573	Fehsenfeld, 70
$O_2^+ + Na \rightarrow Na O^+ +$		$H_2N O_2^+ + N O \rightarrow N_2O_2^+ +$	
03406	Rol, 68	04588	Puckett, 71
03625	Farragher, 69	$N_2O_2^+ + N H_3 \rightarrow N_2O H_3^+ +$	
$O_2^+ + S F_6 \rightarrow S F_5^+ +$		04529	Puckett, 71
04572	Fehsenfeld, 70	$N_2O_2^+ + H_2O \rightarrow H_2N O_2^+ +$	
$O_2^+ + Ar \rightarrow O^+ +$		04251	Puckett, 70
04582	Tiernan, 70	04588	Puckett, 71
$O_2^+ + Ar \rightarrow O^+ +$		$N_2O_2^+ + N O \rightarrow N O^+ +$	
03632	Moran, 68	04529	Puckett, 71
04588	Puckett, 71	$N_2O_2^+ + O_2 \rightarrow O_4^+ +$	
$H_4O_2^+ + H_2O \rightarrow H_5O_2^+ +$		04249	Adams, 70
04253	Good, 70	$H_2O_3^+ + H_2O \rightarrow H_3O^+ +$	
04591	Fehsenfeld, 71	04253	Good, 70
$C O_2^+ + H_2 \rightarrow C O_2H^+ +$		04591	Fehsenfeld, 71
03043	Fehsenfeld, 67	$H_2O_3^+ + H_2O \rightarrow H_4O_2^+ +$	
03082	Guthier, 57	04253	Good, 70
03198	Kubose, 63	04591	Fehsenfeld, 71
$C O_2^+ + D_2 \rightarrow C O_2D^+ +$		$H_2O_3^+ + H_2O \rightarrow H_4O_4^+ +$	
03083	Harrison, 67	04253	Good, 70
03198	Kubose, 63	04591	Fehsenfeld, 71
03364	Shannon, 65	$H_6O_3^+ + H_2O \rightarrow H_7O_3^+ +$	
$C O_2^+ + C D_4 \rightarrow C O_2D^+ +$		04253	Good, 70
03083	Harrison, 67	$H_4N O_3^+ + N H_3 \rightarrow H_6N O^+ +$	
03125	Shannon, 67	04573	Fehsenfeld, 70
$C O_2^+ + N \rightarrow$		$H_4N O_3^+ + N O \rightarrow H_2N O_2^+ +$	
04250	Fehsenfeld, 70	04588	Puckett, 71
$C O_2^+ + O \rightarrow O^+ +$		$C N O_3^+ + N H_3 \rightarrow N_2H_3O^+ +$	
04250	Fehsenfeld, 70	04568	Dunkin, 71
$C O_2^+ + O \rightarrow O_2^+ +$		$C N O_3^+ + H_2O \rightarrow H_2N O_2^+ +$	
04250	Fehsenfeld, 70	04568	Dunkin, 71
$C O_2^+ + N O \rightarrow N O^+ +$		$C N O_3^+ + N O \rightarrow N_2O_2^+ +$	
04250	Fehsenfeld, 70	04568	Dunkin, 71
$C O_2^+ + O_2 \rightarrow O_2^+ +$		$N_2O_3^+ + H_2O \rightarrow H_2O_3^+ +$	
04250	Fehsenfeld, 70	04249	Adams, 70
04267	Schildcrout, 70	$N_2O_3^+ + S O_2 \rightarrow S O_4^+ +$	
$C O_2^{+2} + C O_2 \rightarrow$		04249	Adams, 70
04256	Schildcrout, 69		

$O_4^+ + H_2O \rightarrow H_2O_3^+$		$C F_2^+ + C_3F_8 \rightarrow C_2F_5^+$	
04253 Good, 70		04589 Su, 71	
04591 Fehsenfeld, 71			
$O_4^+ + N_2O \rightarrow N_2O_3^+$		$C F_2^+ + C_3F_8 \rightarrow C_3F_7^+$	
04249 Adams, 70		04589 Su, 71	
$O_4^+ + S O_2 \rightarrow S O_4^+$		$C F_2^+ + M \rightarrow C F^+$	
04249 Adams, 70		04589 Su, 71	
$H_4O_4^+ + H_2O \rightarrow H_5O_2^+$		$C_2F_2^+ + C_3F_8 \rightarrow C F_3^+$	
04253 Good, 70		04589 Su, 71	
$H_4O_4^+ + H_2O \rightarrow H_6O_3^+$		$C F_3^+ + C_3F_8 \rightarrow C_2F_5^+$	
04253 Good, 70		04589 Su, 71	
$H_4O_4^+ + H_2O \rightarrow H_6O_5^+$		$C F_3^+ + C_3F_8 \rightarrow C_3F_7^+$	
04253 Good, 70		04589 Su, 71	
$H_9O_4^+ + N O \rightarrow H_7O_3^+$		$C_2F_3^+ + C_3F_8 \rightarrow C_3F_7^+$	
04588 Puckett, 71		04589 Su, 71	
$H_6N O_4^+ + N H_3 \rightarrow H_8N O_2^+$		$C_2F_3^+ + M \rightarrow C F^+$	
04573 Fehsenfeld, 70		04589 Su, 71	
$H_6N O_4^+ + H_2O \rightarrow H_3O^+$		$C_2F_4^+ + M \rightarrow C F^+$	
04251 Puckett, 70		04589 Su, 71	
$H_6N O_4^+ + H_2O \rightarrow H_7O_3^+$		$C_2F_4^+ + M \rightarrow C F_2^+$	
04588 Puckett, 71		04589 Su, 71	
04592 Fehsenfeld, 71		$C_2F_4^+ + M \rightarrow C F_3^+$	
$H_6N O_4^+ + N O \rightarrow H_4N O_3^+$		04589 Su, 71	
04588 Puckett, 71			
$C F^+ + C_3F_8 \rightarrow C F_3^+$		$C_2F_5^+ + C_3F_8 \rightarrow C_3F_7^+$	
04589 Su, 71		04589 Su, 71	
$C F^+ + C_3F_8 \rightarrow C_2F_4^+$		$C_2F_5^+ + M \rightarrow C F_3^+$	
04589 Su, 71		04589 Su, 71	
$C F^+ + C_3F_8 \rightarrow C_3F_7^+$		$C_3F_7^+ + M \rightarrow C_2F_2^+$	
04589 Su, 71		04589 Su, 71	
$C H_3F^+ + C H_3F \rightarrow C H_3F H^+$		$C_3F_7^+ + M \rightarrow C F_3^+$	
04280 Marshall, 70		04589 Su, 71	
$C H_3F^+ + C H_3F \rightarrow C_2H_4F^+$		$C_3F_7^+ + M \rightarrow C_2F_5^+$	
04280 Marshall, 70		04589 Su, 71	
$C H_3F H^+ + C H_3F \rightarrow C_2H_6F^+$		$Ne^+ + H_2 \rightarrow H^+$	
04280 Marshall, 70		03153 Friedman, 65	
$C F_2^+ + C_3F_8 \rightarrow C F_3^+$		$Ne^+ + H_2 \rightarrow Ne H^+$	
04589 Su, 71		03082 Gutbier, 57	
$C F_2^+ + C_3F_8 \rightarrow C_2F_4^+$		03097 Aquilanti, 65	
04589 Su, 71		03120 Schissler, 56	
		03133 Stevenson, 58	

$\text{Ne}^{+2} + \text{H}_2 \rightarrow$		$\text{Ne H}^+ + \text{H}_2 \rightarrow$	
03097	Aquilanti, 65	04285	Adams, 70
$\text{Ne}^+ + \text{C H}_4 \rightarrow \text{C H}^+ +$		$\text{Ne H}_2^+ + \text{H}_2 \rightarrow$	
03325	Hertel, 65	04285	Adams, 70
$\text{Ne}^+ + \text{C H}_4 \rightarrow \text{C H}_2^+ +$		$\text{He Ne}^+ + \text{Ne} \rightarrow \text{Ne}_2^+ +$	
03325	Hertel, 65	04289	Bohme, 70
$\text{Ne}^+ + \text{C H}_4 \rightarrow$		04602	Veatch, 70
04570	Jones, 71	$\text{Ne}_2^+ + \text{H}_2 \rightarrow$	
$\text{Ne}^+ + \text{C}_2\text{H}_2 \rightarrow$		04285	Adams, 70
04570	Jones, 71	$\text{Ne}_2^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$	
$\text{Ne}^+ + \text{C}_2\text{H}_4 \rightarrow$		04289	Bohme, 70
03199	Franklin, 61	$\text{Ne}_2^+ + \text{C O} \rightarrow \text{C O}^+ +$	
$\text{Ne}^+ + \text{C}_2\text{D}_2 \rightarrow$		04289	Bohme, 70
04570	Jones, 71	$\text{Ne}_2^+ + \text{N O} \rightarrow \text{N O}^+ +$	
$\text{Ne}^+ + \text{N}_2 \rightarrow \text{N}^+ +$		04289	Bohme, 70
03100	Maier, 64	$\text{Ne}_2^+ + \text{O}_2 \rightarrow \text{O}^+ +$	
$\text{Ne}^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$		04289	Bohme, 70
03852	Schlumbohm, 68	$\text{Ne}_2^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$	
$\text{Ne}^+ + \text{N}_2 \rightarrow$		04289	Bohme, 70
04104	Schlumbohm, 69	$\text{Ne}_2^+ + \text{C O}_2 \rightarrow \text{O}^+ +$	
$\text{Ne}^+ + \text{H}_2\text{O} \rightarrow$		04289	Bohme, 70
04533	Howard, 70	$\text{Ne}_2^+ + \text{C O}_2 \rightarrow \text{C O}^+ +$	
$\text{Ne}^+ + \text{C O} \rightarrow \text{C}^+ +$		04289	Bohme, 70
03076	Giese, 63	$\text{Ne}_2^+ + \text{C O}_2 \rightarrow \text{C O}_2^+ +$	
$\text{Ne}^+ + \text{N O} \rightarrow \text{N}^+ +$		04289	Bohme, 70
03197	Moran, 66	$\text{Ne}_2^+ + \text{Ar} \rightarrow \text{Ar}^+ +$	
$\text{Ne}^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$		04289	Bohme, 70
03852	Schlumbohm, 68	$\text{Ne}_2^+ + \text{Kr} \rightarrow \text{Kr}^+ +$	
$\text{Ne}^+ + \text{O}_2 \rightarrow$		04289	Bohme, 70
04104	Schlumbohm, 69	$\text{Ne}_2\text{H}^+ + \text{H}_2 \rightarrow$	
04283	Bolden, 70	04285	Adams, 70
$\text{Ne}^+ + \text{C O}_2 \rightarrow \text{C O}^+ +$		$\text{Na}^+ + \text{N O} \rightarrow$	
03852	Schlumbohm, 68	04596	Johnsen, 71
$\text{Ne}^+ + \text{C O}_2 \rightarrow \text{C O}_2^+ +$		$\text{Na}^+ + \text{O}_2 \rightarrow$	
03852	Schlumbohm, 68	04596	Johnsen, 71
$\text{Ne}^+ + \text{C O}_2 \rightarrow$		$\text{Na}^+ + \text{O}_3 \rightarrow \text{Na O}^+ +$	
04104	Schlumbohm, 69	03405	Ferguson, 68
$\text{Ne}^+ + \text{Ne} \rightarrow \text{Ne}^+ +$		$\text{Mg}^+ + \text{O}_3 \rightarrow \text{Mg O}^+ +$	
04255	Kaneko, 69	03405	Ferguson, 68
04270	Kanomata, 69	$\text{Mg O}^+ + \text{O} \rightarrow \text{Mg}^+ +$	
04577	Jones, 70	03405	Ferguson, 68

$\text{Si}^+ + \text{O}_2 \rightarrow \text{Si O}^+ +$		$\text{S F}_3^+ + \text{N O} \rightarrow \text{N O}^+ +$	
04269 Fehsenfeld, 69		04572 Fehsenfeld, 70	
$\text{Si H}_2^+ + \text{Si H}_4 \rightarrow \text{Si H}_3^+ +$		$\text{S F}_4^+ + \text{N O} \rightarrow \text{N O}^+ +$	
03088 Hess, 66		04572 Fehsenfeld, 70	
$\text{Si H}_2^+ + \text{Si H}_4 \rightarrow \text{Si}_2\text{H}^+ +$		$\text{S F}_4^+ + \text{O}_2 \rightarrow \text{S F}_3^+ +$	
03088 Hess, 66		04572 Fehsenfeld, 70	
$\text{Si H}_2^+ + \text{Si H}_4 \rightarrow \text{Si}_2\text{H}_2^+ +$		$\text{S F}_5^+ + \text{N O} \rightarrow \text{N O}^+ +$	
03088 Hess, 66		04572 Fehsenfeld, 70	
$\text{Si H}_2^+ + \text{Si H}_4 \rightarrow \text{Si}_2\text{H}_3^+ +$		$\text{S F}_5^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$	
03088 Hess, 66		04572 Fehsenfeld, 70	
$\text{Si H}_2^+ + \text{Si H}_4 \rightarrow \text{Si}_2\text{H}_4^+ +$		$\text{C S}_2^+ + \text{C}_5\text{H}_{12} \rightarrow \text{C}_5\text{H}_{12}^+ +$	
03088 Hess, 66		03333 Beolrijk, 62	
$\text{Si D}_2^+ + \text{Si D}_4 \rightarrow \text{Si}_2\text{D}_2^+ +$		$\text{H Cl}^+ + \text{C H}_4 \rightarrow \text{H}_2\text{Cl}^+ +$	
03088 Hess, 66		03189 Field, 58	
$\text{Si D}_2^+ + \text{Si D}_4 \rightarrow \text{Si}_2\text{D}_3^+ +$		$\text{H Cl}^+ + \text{C D}_4 \rightarrow \text{H D Cl}^+ +$	
03088 Hess, 66		03189 Field, 58	
$\text{Si D}_2^+ + \text{Si D}_4 \rightarrow \text{Si}_2\text{D}_4^+ +$		$\text{H Cl}^+ + \text{H Cl} \rightarrow \text{H}_2\text{Cl}^+ +$	
03088 Hess, 66		03120 Schissler, 56	
$\text{Si O}^+ + \text{N} \rightarrow \text{N O}^+ +$		03133 Stevenson, 58	
04269 Fehsenfeld, 69		03189 Field, 58	
$\text{Si O}^+ + \text{N} \rightarrow \text{Si}^+ +$		$\text{H Cl}^+ + \text{Ar} \rightarrow \text{Ar H}^+ +$	
04269 Fehsenfeld, 69		03120 Schissler, 56	
$\text{Si O}^+ + \text{O} \rightarrow \text{Si}^+ +$		$\text{C H}_2\text{Cl}^+ + \text{C H}_3\text{Cl} \rightarrow \text{C H}_3\text{Cl H}^+ +$	
04269 Fehsenfeld, 69		03423 Gupta, 67	
$\text{P H}_3^+ + \text{D}_2 \rightarrow \text{P H}_3\text{D}^+ +$		$\text{C H}_3\text{Cl}^+ + \text{C H}_3\text{Cl} \rightarrow \text{C H}_3\text{Cl H}^+ +$	
03074 Giardini – Guidoni, 60		03423 Gupta, 67	
$\text{P H}_3^+ + \text{P H}_3 \rightarrow \text{P H}_4^+ +$		$\text{C}_3\text{H}_7\text{Cl}^+ + \text{C}_3\text{H}_7\text{Cl} \rightarrow \text{C}_6\text{H}_{14}\text{Cl}^+ +$	
03074 Giardini – Guidoni, 60		03332 Theard, 62	
$\text{H S}^+ + \text{H}_2\text{S} \rightarrow \text{H}_3\text{S}^+ +$		$\text{Ar}^+ + \text{H}_2 \rightarrow \text{Ar H}^+ +$	
03423 Gupta, 67		03041 Fehsenfeld, 66	
$\text{H}_2\text{S}^+ + \text{D}_2 \rightarrow \text{H}_2\text{S D}^+ +$		03043 Fehsenfeld, 67	
04245 Ding, 69		03074 Giardini – Guidoni, 60	
$\text{H}_2\text{S}^+ + \text{C H}_4 \rightarrow \text{H}_3\text{S}^+ +$		03082 Gutbier, 57	
03189 Field, 58		03097 Aquilanti, 65	
$\text{H}_2\text{S}^+ + \text{C D}_4 \rightarrow \text{H}_2\text{D S}^+ +$		03132 Stevenson, 55	
03189 Field, 58		03133 Stevenson, 58	
$\text{H}_2\text{S}^+ + \text{H}_2\text{S} \rightarrow \text{H}_3\text{S}^+ +$		03198 Kubose, 63	
03189 Field, 58		03201 Herman, 63	
03423 Gupta, 67		04102 Bowers, 69	
$\text{S O}_4^+ + \text{H}_2\text{O} \rightarrow \text{H}_2\text{O}_3^+ +$			
04249 Adams, 70			

$\text{Ar}^+ + \text{H}_2 \rightarrow$		$\text{Ar}^+ + \text{C H}_4 \rightarrow$	
04409	Adams, 70	04283	Bolden, 70
$\text{Ar}^{+2} + \text{H}_2 \rightarrow$		04570	Jones, 71
03097	Aquilanti, 65	$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}^+ +$	
$\text{Ar}^+ + \text{H D} \rightarrow \text{Ar H}^+ +$		03101	Maier, 65
03132	Stevenson, 55	$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow \text{C H}^+ +$	
03133	Stevenson, 58	03101	Maier, 65
03420	Henglein, 65	$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_2^+ +$	
04102	Bowers, 69	03101	Maier, 65
$\text{Ar}^+ + \text{H D} \rightarrow \text{Ar D}^+ +$		$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_2\text{H}^+ +$	
03132	Stevenson, 55	03101	Maier, 65
03133	Stevenson, 58	$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow \text{C}_2\text{H}_2^+ +$	
03420	Henglein, 65	03101	Maier, 65
04102	Bowers, 69	$\text{Ar}^+ + \text{C}_2\text{H}_2 \rightarrow$	
$\text{Ar}^+ + \text{D}_2 \rightarrow \text{Ar D}^+ +$		04570	Jones, 71
03077	Giese, 63	$\text{Ar}^+ + \text{C}_2\text{H}_4 \rightarrow$	
03083	Harrison, 67	03199	Franklin, 61
03132	Stevenson, 55	$\text{Ar}^+ + \text{C}_2\text{H}_6 \rightarrow$	
03133	Stevenson, 58	04570	Jones, 71
03198	Kubose, 63	$\text{Ar}^+ + \text{C}_2\text{D}_4 \rightarrow$	
03364	Shannon, 65	04570	Jones, 71
04102	Bowers, 69	$\text{Ar}^+ + \text{N H}_3 \rightarrow \text{Ar H}^+ +$	
$\text{Ar}^+ + \text{D}_2 \rightarrow$		03074	Giardini - Guidoni, 60
04409	Adams, 70	$\text{Ar}^+ + \text{N H}_3 \rightarrow$	
$\text{Ar}^+ + \text{He} \rightarrow \text{He}^+ +$		04283	Bolden, 70
03362	Mahadevan, 68	$\text{Ar}^+ + \text{N}_2 \rightarrow \text{N}^+ +$	
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{C H}_2^+ +$		03041	Fehsenfeld, 66
03190	Melton, 60	03100	Maier, 64
03224	Field, 62	$\text{Ar}^+ + \text{N}_2 \rightarrow \text{N}_2^+ +$	
03325	Hertel, 65	03194	Warneck, 67
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{C H}_3^+ +$		03362	Mahadevan, 68
03190	Melton, 60	03853	Ong, 69
03224	Field, 62	04255	Kaneko, 69
03325	Hertel, 65	$\text{Ar}^+ + \text{H}_2\text{O} \rightarrow \text{H}_2\text{O}^+ +$	
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{C H}_4^+ +$		03424	Turner, 68
03190	Melton, 60	$\text{Ar}^+ + \text{H}_2\text{O} \rightarrow$	
03325	Hertel, 65	04533	Howard, 70
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{Ar H}^+ +$		$\text{Ar}^+ + \text{C O} \rightarrow \text{C}^+ +$	
03224	Field, 62	03041	Fehsenfeld, 66
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{Ar C H}_2^+ +$		03076	Giese, 63
03224	Field, 62	03194	Warneck, 67
$\text{Ar}^+ + \text{C H}_4 \rightarrow \text{Ar C H}_3^+ +$		$\text{Ar}^+ + \text{C O} \rightarrow \text{C O}^+ +$	
03224	Field, 62	03853	Ong, 69

$\text{Ar}^+ + \text{N O} \rightarrow \text{N O}^+ +$		$\text{Ar H}^+ + \text{H}_2 \rightarrow$	
03194 Warneck, 67		04285 Adams, 70	
03853 Ong, 69			
$\text{Ar}^+ + \text{N}_2\text{O} \rightarrow \text{N O}^+ +$		$\text{Ar H}^+ + \text{C H}_4 \rightarrow$	
03101 Maier, 65		03408 Leventhal, 67	
$\text{Ar}^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$		$\text{Ar H}^+ + \text{C}_2\text{H}_2 \rightarrow$	
03041 Fehsenfeld, 66		03408 Leventhal, 67	
03194 Warneck, 67		$\text{Ar H}^+ + \text{C}_2\text{H}_4 \rightarrow$	
03853 Ong, 69		03408 Leventhal, 67	
$\text{Ar}^+ + \text{O}_2 \rightarrow$		$\text{Ar H}^+ + \text{C}_2\text{H}_6 \rightarrow$	
04409 Adams, 70		03408 Leventhal, 67	
$\text{Ar}^+ + \text{C O}_2 \rightarrow \text{C O}_2^+ +$		$\text{Ar H}^+ + \text{C}_3\text{H}_8 \rightarrow$	
03041 Fehsenfeld, 66		03408 Leventhal, 67	
03194 Warneck, 67		$\text{Ar H}^+ + \text{C}_4\text{H}_8 \rightarrow$	
$\text{Ar}^+ + \text{C H}_3\text{F} \rightarrow$		03408 Leventhal, 67	
04570 Jones, 71		$\text{Ar H}^+ + \text{C}_4\text{H}_{10} \rightarrow$	
$\text{Ar}^+ + \text{P H}_3 \rightarrow \text{Ar H}^+ +$		03408 Leventhal, 67	
03074 Giardini - Guidoni, 60		$\text{Ar H}^+ + \text{C}_5\text{H}_{12} \rightarrow$	
$\text{Ar}^+ + \text{S F}_6 \rightarrow \text{S F}_5^+ +$		03408 Leventhal, 67	
04572 Fehsenfeld, 70		$\text{Ar H}_2^+ + \text{H}_2 \rightarrow$	
$\text{Ar}^+ + \text{H Cl} \rightarrow \text{Ar H}^+ +$		04285 Adams, 70	
03120 Schissler, 56		$\text{Ar D}^+ + \text{D}_2 \rightarrow \text{D}_3^+ +$	
$\text{Ar}^+ + \text{C H}_3\text{Cl} \rightarrow$		04409 Adams, 70	
04570 Jones, 71		$\text{Ar N}_2^+ + \text{N}_2 \rightarrow \text{N}_4^+ +$	
$\text{Ar}^+ + \text{C Cl}_4 \rightarrow \text{Cl}^+ +$		03110 Munson, 62	
03324 Weiner, 64		$\text{Ar C O}^+ + \text{C O} \rightarrow \text{C}_2\text{O}_2^+ +$	
$\text{Ar}^+ + \text{C Cl}_4 \rightarrow \text{C Cl}_3^+ +$		04289 Bohme, 70	
03324 Weiner, 64		$\text{Ar Ne}^+ + \text{Ar} \rightarrow \text{Ar}_2^+ +$	
$\text{Ar}^+ + \text{C Cl}_4 \rightarrow \text{C Cl}_3^+ +$		02984 Bloomfield, 64	
03324 Weiner, 64		$\text{Ar}_2^+ + \text{H}_2 \rightarrow$	
$\text{Ar}^+ + \text{Ar} \rightarrow \text{Ar}^+ +$		04285 Adams, 70	
03114 Neynaber, 67		$\text{Ar}_2^+ + \text{C O} \rightarrow \text{C O}^+ +$	
03326 Cramer, 59		04289 Bohme, 70	
03362 Mahadevan, 68		$\text{Ar}_2^+ + \text{C O} \rightarrow \text{Ar C O}^+ +$	
04100 Trujillo, 66		04289 Bohme, 70	
04577 Jones, 70		$\text{Ar}_2^+ + \text{N O} \rightarrow \text{N O}^+ +$	
$\text{Ar}^+ + \text{As H}_3 \rightarrow \text{Ar H}^+ +$		04289 Bohme, 70	
03074 Giardini - Guidoni, 60		$\text{Ar}_2^+ + \text{O}_2 \rightarrow \text{O}_2^+ +$	
$\text{Ar H}^+ + \text{H}_2 \rightarrow \text{H}_3^+ +$		04289 Bohme, 70	
03043 Fehsenfeld, 67		$\text{Ar}_2^+ + \text{C O}_2 \rightarrow \text{C O}_2^+ +$	
04409 Adams, 70		04289 Bohme, 70	

$\text{Ar}_2^+ + \text{Kr} \rightarrow \text{Kr}^+ +$		$\text{Kr}^{+2} + \text{H}_2 \rightarrow \text{Kr}^+ +$	
04289	Bohme, 70	03097	Aquilanti, 65
$\text{Ar}_2\text{H}^+ + \text{H}_2 \rightarrow$		$\text{Kr}^+ + \text{D}_2 \rightarrow \text{D}_2^+ +$	
04285	Adams, 70	03101	Maier, 65
$\text{K}^+ + \text{N O} \rightarrow$		$\text{Kr}^+ + \text{D}_2 \rightarrow \text{Kr D}^+ +$	
04596	Johnsen, 71	03120	Schissler, 56
$\text{K}^+ + \text{O}_2 \rightarrow$		$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{C H}_3^+ +$	
04596	Johnsen, 71	03104	Melton, 64
$\text{K}^+ + \text{O}_3 \rightarrow \text{K O}^+ +$		03224	Field, 62
03405	Ferguson, 68	03858	Durden, 69
$\text{K}^+ + \text{K} \rightarrow \text{K}^+ +$		$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{C H}_3^+ +$	
03365	Kushnir, 59	03325	Hertel, 65
03855	Palyukh, 69	$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{C H}_4^+ +$	
$\text{Ca}^+ + \text{O}_3 \rightarrow \text{Ca O}^+ +$		03104	Melton, 64
03405	Ferguson, 68	03224	Field, 62
$\text{Fe}^+ + \text{O}_3 \rightarrow \text{Fe O}^+ +$		03325	Hertel, 65
03405	Ferguson, 68	03858	Durden, 69
$\text{As H}_3^+ + \text{D}_2 \rightarrow \text{As H}_3\text{D}^+ +$		$\text{Kr}^+ + \text{C H}_4 \rightarrow$	
03074	Giardini - Guidoni, 60	04570	Jones, 71
$\text{As H}_3^+ + \text{As H}_3 \rightarrow \text{As H}_4^+ +$		$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{Kr H}^+ +$	
03074	Giardini - Guidoni, 60	03224	Field, 62
$\text{H Br}^+ + \text{H Br} \rightarrow \text{H}_2\text{Br}^+ +$		$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{Kr C H}_2^+ +$	
03120	Schissler, 56	03224	Field, 62
03133	Stevenson, 58	$\text{Kr}^+ + \text{C H}_4 \rightarrow \text{Kr C H}_3^+ +$	
$\text{H Br}^+ + \text{Kr} \rightarrow \text{Kr H}^+ +$		03224	Field, 62
03120	Schissler, 56	$\text{Kr}^+ + \text{C}_2\text{H}_2 \rightarrow$	
$\text{C H}_2\text{Br}^+ + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C H Br}_2^+ +$		04570	Jones, 71
03332	Theard, 62	$\text{Kr}^+ + \text{C}_2\text{H}_4 \rightarrow$	
$\text{C}_2\text{H}_5\text{Br}^+ + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C}_4\text{H}_9\text{Br}^+ +$		03199	Franklin, 61
03332	Theard, 62	04570	Jones, 71
$\text{C}_2\text{H}_5\text{Br}^+ + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C}_4\text{H}_{10}\text{Br}^+ +$		$\text{Kr}^+ + \text{C}_2\text{H}_6 \rightarrow$	
03332	Theard, 62	04570	Jones, 71
$\text{C}_2\text{H}_5\text{Br}^+ + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C}_2\text{H}_6\text{Br}_2^+ +$		$\text{Kr}^+ + \text{H}_2\text{O} \rightarrow$	
03332	Theard, 62	04533	Howard, 70
$\text{C}_2\text{H}_5\text{Br}^+ + \text{C}_2\text{H}_5\text{Br} \rightarrow \text{C}_4\text{H}_{10}\text{Br}_2^+$		$\text{Kr}^+ + \text{N}_2\text{O} \rightarrow \text{O}^+ +$	
03332	Theard, 62	03100	Maier, 64
$\text{Kr}^+ + \text{H}_2 \rightarrow \text{Kr H}^+ +$		$\text{Kr}^+ + \text{N}_2\text{O} \rightarrow \text{N O}^+ +$	
03082	Gutbier, 57	03100	Maier, 64
03097	Aquilanti, 65	03101	Maier, 65
03120	Schissler, 56	$\text{Kr}^+ + \text{H Br} \rightarrow \text{Kr H}^+ +$	
03133	Stevenson, 58	03120	Schissler, 56

$\text{Kr}^+ + \text{Kr} \rightarrow \text{Kr}^+ +$		$\text{Xe}^+ + \text{Xe} \rightarrow \text{Xe}^+ +$	
04577 Jones, 70		03365 Kushnir, 59	
$\text{Kr C O}^+ + \text{C O} \rightarrow \text{C}_2\text{O}_2^+ +$		$\text{Kr Xe}^+ + \text{Xe} \rightarrow \text{Xe}_2^+ +$	
03110 Munson, 62		03328 Kebarle, 67	
$\text{Ar Kr}^+ + \text{Kr} \rightarrow \text{Kr}_2^+ +$		$\text{Cs}^+ + \text{Cs} \rightarrow \text{Cs}^+ +$	
04289 Bohme, 70		03365 Kushnir, 59	
$\text{Kr}_2^+ + \text{Xe} \rightarrow \text{Kr Xe}^+ +$		03856 Palyukh, 69	
03328 Kebarle, 67		$\text{Cs}^+ + \text{Cs}_2 \rightarrow \text{Cs}_2^+ +$	
$\text{Rb}^+ + \text{Rb}_2 \rightarrow \text{Rb}_2^+ +$		03098 Lee, 65	
03098 Lee, 65		04106 Lee, 65	
04106 Lee, 65		$\text{Ba}^+ + \text{N O} \rightarrow$	
$\text{I}^+ + \text{Hg} \rightarrow \text{Hg}^+ +$		04596 Johnsen, 71	
03033 Edmonds, 64		$\text{Ba}^+ + \text{O}_2 \rightarrow$	
$\text{C}_2\text{H}_5\text{I}^+ + \text{C}_2\text{H}_5\text{I} \rightarrow \text{C}_4\text{H}_{10}\text{I}_2^+$		04596 Johnsen, 71	
03104 Melton, 64		$\text{Hg}^+ + \text{O}_2 \rightarrow \text{O Hg}^+ +$	
$\text{Xe}^+ + \text{H}_2 \rightarrow \text{Xe H}^+ +$		03201 Herman, 63	
03097 Aquilanti, 65			
$\text{Xe}^{+2} + \text{H}_2 \rightarrow \text{Xe}^+ +$			
03097 Aquilanti, 65			
$\text{Xe}^+ + \text{C H}_4 \rightarrow \text{C H}_3^+ +$			
03325 Hertel, 65			
$\text{Xe}^+ + \text{C H}_4 \rightarrow \text{C H}_4^+ +$		$\text{H}^- + \text{H} \rightarrow \text{H}_2 + \text{e} +$	
03325 Hertel, 65		03121 Schmeltekopf, 67	
$\text{Xe}^+ + \text{C H}_4 \rightarrow \text{Xe H}^+ +$		$\text{H}^- + \text{He} \rightarrow$	
03224 Field, 62		04293 Bailey, 57	
$\text{Xe}^+ + \text{C H}_4 \rightarrow \text{Xe C H}_2^+ +$		$\text{H}^- + \text{H}_2\text{O} \rightarrow \text{O H}^- +$	
03224 Field, 62		03621 Stockdale, 68	
$\text{Xe}^+ + \text{C H}_4 \rightarrow \text{Xe C H}_3^+ +$		04272 Stockdale, 69	
03224 Field, 62		$\text{H}^- + \text{C O} \rightarrow \text{e} +$	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C H}^+ +$		04290 Dunkin, 70	
03101 Maier, 65		$\text{H}^- + \text{N O} \rightarrow \text{e} +$	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C H}_2^+ +$		04290 Dunkin, 70	
03101 Maier, 65		$\text{H}^- + \text{N}_2\text{O} \rightarrow \text{O H}^- +$	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_2\text{H}_2^+ +$		04290 Dunkin, 70	
03101 Maier, 65		$\text{H}^- + \text{O}_2 \rightarrow \text{e} +$	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_2\text{H}_3^+ +$		04258 Bailey, 70	
03101 Maier, 65		04290 Dunkin, 70	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow \text{C}_2\text{H}_4^+ +$		$\text{H}^- + \text{O}_2 \rightarrow \text{O}_2^- +$	
03101 Maier, 65		04258 Bailey, 70	
$\text{Xe}^+ + \text{C}_2\text{H}_4 \rightarrow$		04282 Vogt, 70	
03199 Franklin, 61		$\text{H}^- + \text{O}_2 \rightarrow$	
		02979 Baker, 62	

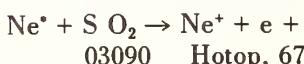
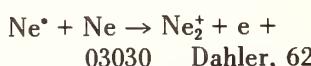
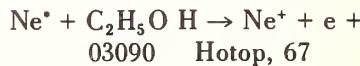
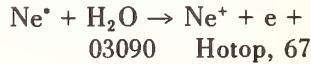
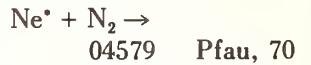
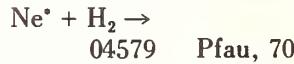
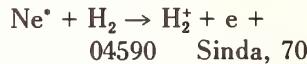
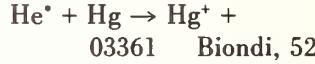
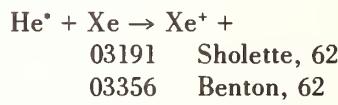
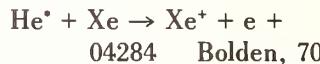
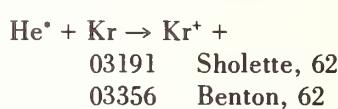
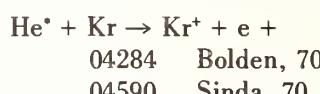
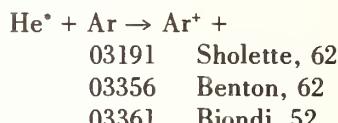
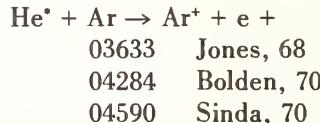
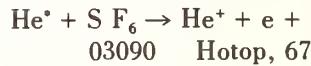
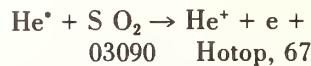
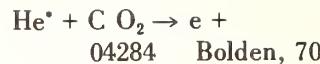
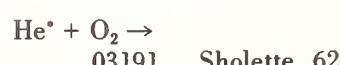
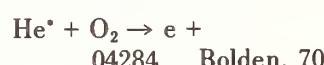
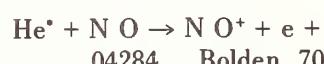
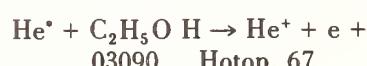
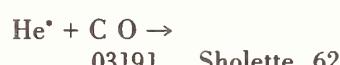
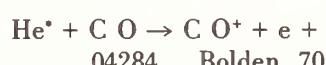
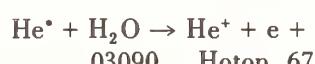
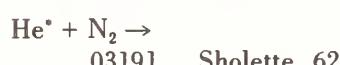
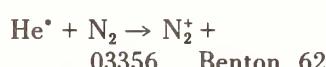
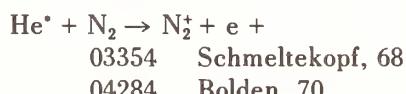
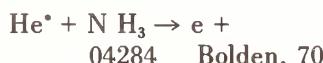
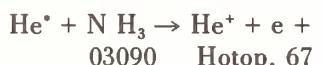
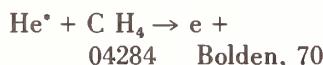
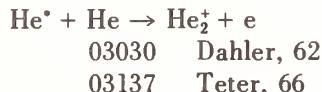
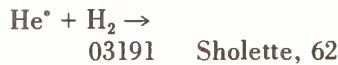
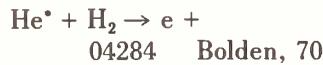
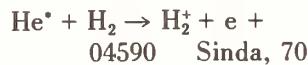
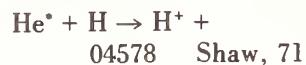
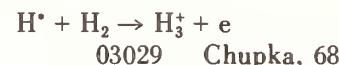
$H^- + N O_2 \rightarrow N O_2^- +$		$O^- + D_2 \rightarrow O D^- +$	
04282	Vogt, 70	03617	Martin, 68
$H^- + Ne \rightarrow$		03622	Martin, 67
04293	Bailey, 57	$O^- + He \rightarrow e^- +$	
$H^- + Ar \rightarrow$		04257	Wynn, 70
04293	Bailey, 57	$O^- + C_2 H_2 \rightarrow C_2 H^- +$	
$D^- + D_2 O \rightarrow O D^- +$		04254	Stockdale, 70
03426	Paulson, 66	$O^- + C_2 H_2 \rightarrow C_2 O H^- +$	
03621	Stockdale, 68	04254	Stockdale, 70
04272	Stockdale, 69	$O^- + C_2 H_2 \rightarrow C_2 H_2 O^- +$	
$D^- + O_2 \rightarrow O_2^- +$		04254	Stockdale, 70
04282	Vogt, 70	$O^- + C_2 H_4 \rightarrow C_2 H_2^- +$	
$D^- + N O_2 \rightarrow N O_2^- +$		04254	Stockdale, 70
04282	Vogt, 70	$O^- + C_6 H_6 \rightarrow C_6 H_4^- +$	
$C^- + H_2 \rightarrow e^- +$		04254	Stockdale, 70
04263	Fehsenfeld, 70	$O^- + C_6 H_6 \rightarrow C_6 H_5 O^- +$	
$C^- + C O \rightarrow e^- +$		04254	Stockdale, 70
04263	Fehsenfeld, 70	$O^- + C_2 D_2 \rightarrow C_2 D^- +$	
$C^- + N_2 O \rightarrow$		04254	Stockdale, 70
04263	Fehsenfeld, 70	$O^- + C_2 D_2 \rightarrow C_2 O D^- +$	
$C^- + O_2 \rightarrow O^- +$		04254	Stockdale, 70
04263	Fehsenfeld, 70	$O^- + C_6 D_6 \rightarrow C_6 D_4^- +$	
$C^- + C O_2 \rightarrow e^- +$		04254	Stockdale, 70
04263	Fehsenfeld, 70	$O^- + C_6 D_6 \rightarrow C_6 D_5 O^- +$	
$N H_2^- + C H_3 O H \rightarrow C H_3 O^- +$		04254	Stockdale, 70
03331	Vogt, 67	$O^- + N \rightarrow e^- +$	
$N D_2^- + O_2 \rightarrow O_2^- +$		03042	Fehsenfeld, 66
04282	Vogt, 70	03044	Fehsenfeld, 67
$C N^- + Cl C N \rightarrow$		$O^- + N_2 \rightarrow e^- +$	
04530	Di Domenico, 71	03042	Fehsenfeld, 66
$O^- + H_2 \rightarrow O H^- +$		03854	Roche, 69
03042	Fehsenfeld, 66	04287	Compton, 70
03617	Martin, 68	$O^- + O \rightarrow e^- +$	
03622	Martin, 67	03042	Fehsenfeld, 66
$O^- + H_2 \rightarrow e^- +$		03044	Fehsenfeld, 67
03042	Fehsenfeld, 66	$O^- + H_2 O \rightarrow O H^- +$	
03220	Moruzzi, 66	03867	Vogt, 69
03352	Moruzzi, 68		

$O^- + C O \rightarrow e +$		$O^- + O_3 \rightarrow O_3^- +$	
03042 Fehsenfeld, 66		03044 Fehsenfeld, 67	
03220 Moruzzi, 66			
03352 Moruzzi, 68			
03854 Roche, 69			
$O^- + N O \rightarrow e +$		$O^- + Ne \rightarrow e +$	
03042 Fehsenfeld, 66		04257 Wynn, 70	
03352 Moruzzi, 68			
$O^- + N_2O \rightarrow N O^- +$		$O^- + C N Cl \rightarrow O C N^- +$	
03426 Paulson, 66		03620 Dillard, 68	
04272 Stockdale, 69			
04276 Paulson, 70			
$O^- + N_2O \rightarrow N_2O^- +$		$O^- + Ar \rightarrow e +$	
03426 Paulson, 66		04257 Wynn, 70	
$O^- + N_2O \rightarrow O_2^- +$		$O^- + Ar \rightarrow e +$	
04276 Paulson, 70		03854 Roche, 69	
$O^- + O_2 \rightarrow e +$		$O^- + C H_3I \rightarrow O I^- +$	
03854 Roche, 69		03085 Henglein, 59	
04258 Bailey, 70			
$O^- + O_2 \rightarrow O_2^- +$		$O^- + I Br \rightarrow O I^- +$	
03144 Burch, 57		03085 Henglein, 59	
03426 Paulson, 66			
03867 Vogt, 69		$O^- + I_2 \rightarrow O I^- +$	
04258 Bailey, 70		03085 Henglein, 59	
04291 Varney, 70			
04389 Snuggs, 71		$O^- + He \rightarrow e +$	
04581 Kinsman, 70		03622 Martin, 67	
$O^- + O_2 \rightarrow e +$		04257 Wynn, 70	
03042 Fehsenfeld, 66			
04410 Fehsenfeld, 69		$O^- + N \rightarrow e +$	
$O^- + C O_2 \rightarrow O_2^- +$		03042 Fehsenfeld, 66	
04277 Paulson, 70			
$O^- + C O_2 \rightarrow C O_2^- +$		$O^- + O_2 \rightarrow e +$	
04277 Paulson, 70		04258 Bailey, 70	
$O^- + N O_2 \rightarrow O_2^- +$			
03426 Paulson, 66		$O^- + O_2 \rightarrow$	
$O^- + N O_2 \rightarrow N O_2^- +$		02979 Baker, 62	
03085 Henglein, 59			
03087 Rutherford, 67		$O^- + N O_2 \rightarrow N O_2^- +$	
03426 Paulson, 66		03087 Rutherford, 67	
03623 Peuckert - Kraus, 66		03867 Vogt, 69	
03867 Vogt, 69			
04272 Stockdale, 69		$O^- + C H_3S H \rightarrow C H_3S^- +$	
$O^- + C H_3N O_2 \rightarrow C H_2N O_2^- +$		03331 Vogt, 67	
03085 Henglein, 59			
$O^- + C H_3N O_2 \rightarrow C H N O_2^- +$		$N O^- + N_2O \rightarrow N_2O^- +$	
03085 Henglein, 59		04276 Paulson, 70	
		04278 Chantry, 69	
		$N O^- + N_2O \rightarrow N_3O_2^-$	
		03628 Moruzzi, 68	
		$N O^- + O_2 \rightarrow O_2^- +$	
		03042 Fehsenfeld, 66	

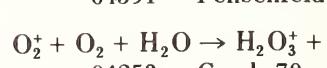
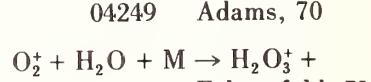
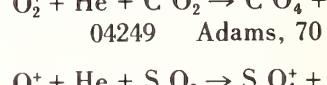
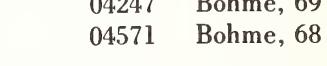
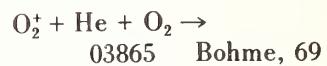
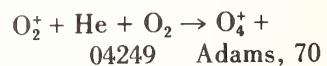
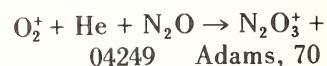
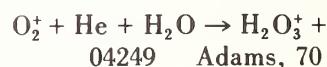
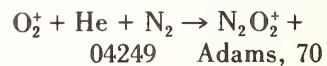
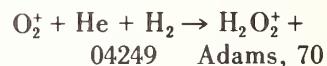
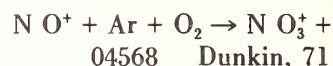
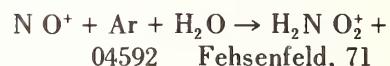
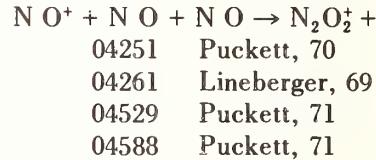
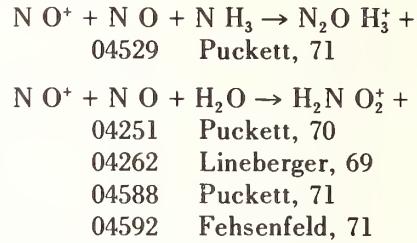
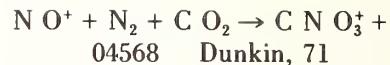
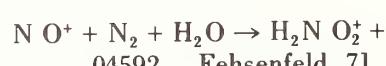
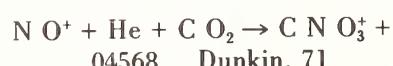
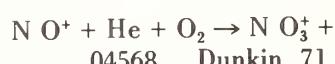
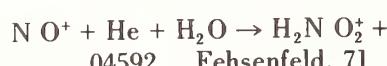
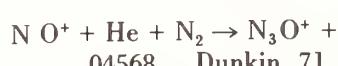
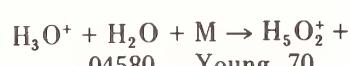
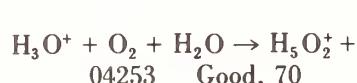
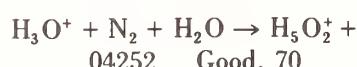
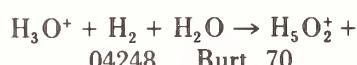
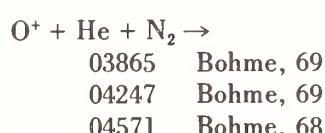
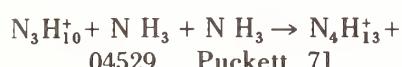
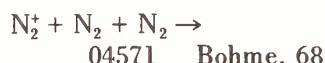
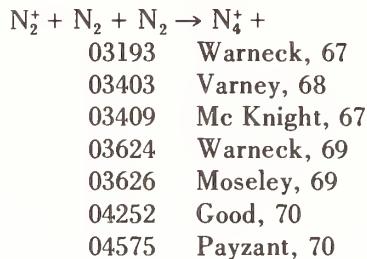
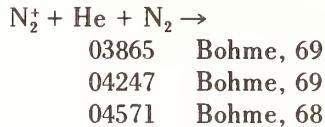
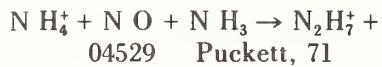
$\text{NO}^- + \text{CO}_2 \rightarrow \text{CO}_2^- +$		$\text{O}_2^- + \text{SF}_6 \rightarrow \text{SF}_6^- +$	
04277	Paulson, 70	04572	Fehsenfeld, 70
$\text{NO}^- + \text{CO}_2 \rightarrow \text{NO}_2^- +$		$\text{HC O}_2^- + \text{SF}_6 \rightarrow \text{SF}_5^- +$	
04277	Paulson, 70	04272	Stockdale, 69
$\text{N}_2\text{O}^- + \text{O}_2 \rightarrow \text{O}_3^- +$		$\text{NO}_2^- + \text{O}_3 \rightarrow \text{NO}_3^- +$	
04246	Ferguson, 69	03151	Fehsenfeld, 68
$\text{O}_2^- + \text{He} \rightarrow \text{e}^- +$		$\text{C}_6\text{H}_5\text{N O}_2^- + \text{SO}_2 \rightarrow \text{S O}_2^- +$	
03622	Martin, 67	03085	Henglein, 59
04257	Wynn, 70	04246	Ferguson, 69
$\text{O}_2^- + \text{N} \rightarrow \text{O}^- +$		$\text{O}_3^- + \text{CO} \rightarrow$	
03042	Fehsenfeld, 66	04246	Ferguson, 69
$\text{O}_2^- + \text{N} \rightarrow \text{e}^- +$		$\text{O}_3^- + \text{NO} \rightarrow \text{NO}_3^- +$	
03042	Fehsenfeld, 66	03044	Fehsenfeld, 67
03044	Fehsenfeld, 67	03044	Fehsenfeld, 67
$\text{O}_2^- + \text{O} \rightarrow \text{O}^- +$		$\text{O}_3^- + \text{CO}_2 \rightarrow \text{CO}_3^- +$	
03042	Fehsenfeld, 66	03044	Fehsenfeld, 67
$\text{O}_2^- + \text{O} \rightarrow \text{e}^- +$		$\text{O}_3^- + \text{NO}_2 \rightarrow \text{NO}_2^- +$	
03042	Fehsenfeld, 66	03087	Rutherford, 67
03044	Fehsenfeld, 67	04246	Ferguson, 69
$\text{O}_2^- + \text{CO} \rightarrow \text{e}^- +$		$\text{O}_3^- + \text{SiO} \rightarrow \text{SiO}_3^- +$	
03352	Moruzzi, 68	04246	Ferguson, 69
$\text{O}_2^- + \text{O}_2 \rightarrow \text{e}^- +$		$\text{O}_3^- + \text{SO}_2 \rightarrow \text{SO}_4^- +$	
03154	Phelps, 61	04246	Ferguson, 69
03854	Roche, 69	04249	Adams, 70
04258	Bailey, 70	04249	Adams, 70
04410	Fehsenfeld, 69	04650	Parkes, 71
$\text{O}_2^- + \text{O}_2 \rightarrow \text{O}_2^- +$		$\text{H}_2\text{O}_3^- + \text{O} \rightarrow \text{O}_4^- +$	
04258	Bailey, 70	03044	Fehsenfeld, 67
04291	Varney, 70	$\text{C O}_3^- + \text{O} \rightarrow \text{O}_2^- +$	
04277	Paulson, 70	03044	Fehsenfeld, 67
$\text{O}_2^- + \text{CO}_2 \rightarrow \text{CO}_2^- +$		$\text{C O}_3^- + \text{NO} \rightarrow \text{NO}_2^- +$	
04277	Paulson, 70	04246	Ferguson, 69
$\text{O}_2^- + \text{CO}_2 \rightarrow \text{CO}_3^- +$		$\text{C O}_3^- + \text{NO}_2 \rightarrow \text{NO}_3^- +$	
04277	Paulson, 70	04246	Ferguson, 69
$\text{O}_2^- + \text{NO}_2 \rightarrow \text{NO}_2^- +$		$\text{NO}_3^- + \text{N} \rightarrow$	
03087	Rutherford, 67	04103	Fehsenfeld, 69
03151	Fehsenfeld, 68	$\text{NO}_3^- + \text{O} \rightarrow$	
03044	Fehsenfeld, 67	04103	Fehsenfeld, 69
$\text{O}_2^- + \text{O}_3 \rightarrow \text{O}_3^- +$		$\text{O}_4^- + \text{N}_2 \rightarrow \text{N}_2\text{O}_2^- +$	
04246	Ferguson, 69	04249	Adams, 70
$\text{O}_2^- + \text{SO}_2 \rightarrow \text{SO}_2^- +$			
04246	Ferguson, 69		
$\text{O}_2^- + \text{SO}_2 \rightarrow \text{SO}_3^- +$			
04246	Ferguson, 69		

$O_4^- + O \rightarrow O_3^- +$		$H S^- + N O_2 \rightarrow N O_2^- +$
04103 Fehsenfeld, 69		03867 Vogt, 69
$O_4^- + H_2O \rightarrow H_2O_3^- +$		$H S^- + Cl C N \rightarrow$
04249 Adams, 70		04530 Di Domenico, 71
04645 Phelps, 70		$C S^- + C S_2 \rightarrow C S_2^- +$
04650 Parkes, 71		03623 Peuckert - Kraus, 66
$O_4^- + C O \rightarrow C O_3^- +$		$S O^- + O_2 \rightarrow O_2^- +$
04249 Adams, 70		04282 Vogt, 70
$O_4^- + N O \rightarrow N O_3^- +$		$S O^- + S O_2 \rightarrow S O_2^- +$
04103 Fehsenfeld, 69		03085 Henglein, 59
04249 Adams, 70		03623 Peuckert - Kraus, 66
$O_4^- + N_2O \rightarrow N_2O_3^- +$		04272 Stockdale, 69
04249 Adams, 70		$S F_5^- + H \rightarrow$
$O_4^- + O_2 \rightarrow O_2^- +$		04572 Fehsenfeld, 70
04598 Mc Knight, 71		$S F_5^- + O \rightarrow$
04645 Phelps, 70		04572 Fehsenfeld, 70
04650 Parkes, 71		$S F_6^- + H \rightarrow S F_5^- +$
$O_4^- + C O_2 \rightarrow C O_4^- +$		04572 Fehsenfeld, 70
04103 Fehsenfeld, 69		$S F_6^- + O \rightarrow O^- +$
04249 Adams, 70		04572 Fehsenfeld, 70
$H_4O_4^- + O_2 \rightarrow H_2O_3^- +$		$S F_6^- + O_3 \rightarrow O_3^- +$
04645 Phelps, 70		04572 Fehsenfeld, 70
$C O_4^- + O \rightarrow C O_3^- +$		$S F_6^- + C_4F_8 \rightarrow C_4F_8^- +$
04103 Fehsenfeld, 69		04572 Fehsenfeld, 70
$C O_4^- + N O \rightarrow N O_3^- +$		$S F_6^- + H Cl \rightarrow F_2Cl^- +$
04103 Fehsenfeld, 69		04272 Stockdale, 69
04249 Adams, 70		$Cl^- + H \rightarrow e^- +$
$F^- + N O_2 \rightarrow N O_2^- +$		03042 Fehsenfeld, 66
03151 Fehsenfeld, 68		$Cl^- + N \rightarrow e^- +$
		03042 Fehsenfeld, 66
$F^- + Ar \rightarrow e^- +$		$Cl^- + O \rightarrow e^- +$
04279 Mandl, 70		03042 Fehsenfeld, 66
$C_4F_8^- + S F_6^- \rightarrow S F_5^- +$		$Cl^- + C O_2 \rightarrow C O_2^- +$
04572 Fehsenfeld, 70		04277 Paulson, 70
$Si F_3^- + Si F_4 \rightarrow Si F_5^- +$		$Cl^- + N O_2 \rightarrow N O_2^- +$
04275 Mac Neil, 70		03151 Fehsenfeld, 68
$S^- + H_2 \rightarrow e^- +$		03867 Vogt, 69
04265 Fehsenfeld, 69		04599 Lifshitz, 70
$S^- + O_2 \rightarrow e^- +$		$Cl^- + S F_6 \rightarrow S F_6^- +$
04265 Fehsenfeld, 69		04599 Lifshitz, 70
$S^- + C O S \rightarrow S_2^- +$		$Br^- + N O_2 \rightarrow N O_2^- +$
03357 Dillard, 68		04599 Lifshitz, 70
$S^- + Cl C N \rightarrow$		
04530 Di Domenico, 71		

Two Body, Excited Neutral-Neutral

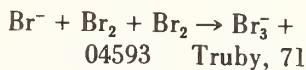
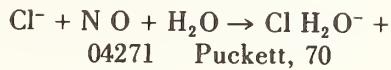
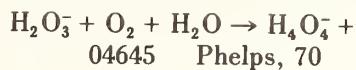
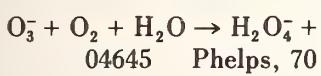
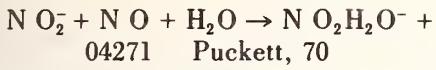
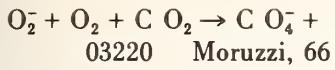


$\text{Ne}^* + \text{S F}_6 \rightarrow \text{Ne}^+ + \text{e} +$		$\text{Na} + \text{O}_2 \rightarrow \text{Na}^+ +$	
03090	Hotop, 67	04601	Moutinho, 71
$\text{Ne}^* + \text{Ar} \rightarrow \text{Ar}^+ +$		$\text{K} + \text{O}_2 \rightarrow \text{K}^+ +$	
03361	Biondi, 52	04601	Moutinho, 71
$\text{Ne}^* + \text{Ar} \rightarrow \text{Ar}^+ + \text{e} +$			
04590	Sinda, 70		
$\text{Ne}^* + \text{Ar} \rightarrow$		Three Body, Positive-Neutral-Neutral	
04579	Pfau, 70		
$\text{Ne}^* + \text{Kr} \rightarrow \text{Kr}^+ + \text{e} +$		$\text{H}^+ + \text{H}_2 + \text{H}_2 \rightarrow \text{H}_3^+ +$	
04590	Sinda, 70	03105	Miller, 68
$\text{Ne}^* + \text{Kr} \rightarrow$		$\text{H}_3^+ + \text{H}_2 + \text{H}_2 \rightarrow \text{H}_5^+ +$	
04579	Pfau, 70	03107	Saporoschenko, 65
$\text{Ne}^* + \text{Xe} \rightarrow$		$\text{H}_3^+ + \text{Ar} + \text{H}_2 \rightarrow \text{Ar H}_3^+ +$	
04579	Pfau, 70	04248	Burt, 70
$\text{Ne}^* + \text{Hg} \rightarrow$		$\text{H}_3^+ + \text{Ar} + \text{Ar} \rightarrow \text{Ar H}_3^+ +$	
04579	Pfau, 70	03043	Fehsenfeld, 67
$\text{Ar}^* + \text{N H}_3 \rightarrow \text{Ar}^+ + \text{e} +$		$\text{D}^+ + \text{D}_2 + \text{D}_2 \rightarrow \text{D}_3^+ +$	
03090	Hotop, 67	03105	Miller, 68
$\text{Ar}^* + \text{H}_2\text{O} \rightarrow \text{Ar}^+ + \text{e} +$		$\text{He}^+ + \text{He} + \text{He} \rightarrow \text{He}_2^+ +$	
03090	Hotop, 67	02980	Beaty, 65
$\text{Ar}^* + \text{C}_2\text{H}_5\text{O H} \rightarrow \text{Ar}^+ + \text{e} +$		02981	Beaty, 63
03090	Hotop, 67	03115	Niles, 65
$\text{Ar}^* + \text{S O}_2 \rightarrow \text{Ar}^+ + \text{e} +$		03117	Oskam, 63
03090	Hotop, 67	03351	Hackam, 64
$\text{Ar}^* + \text{S F}_6 \rightarrow \text{Ar}^+ +$		03618	Patterson, 68
03090	Hotop, 67	03629	Smith, 68
$\text{Ar}^* + \text{S F}_6 \rightarrow \text{Ar}^+ + \text{e} +$		03631	Smith, 68
03090	Hotop, 67	03853	Ong, 69
$\text{Ar}^* + \text{Ar} \rightarrow \text{Ar}_2^+ + \text{e}$		03860	Chen, 69
02982	Becker, 65	$\text{C}_2\text{H}_3^+ + \text{H}_2 + \text{H}_2 \rightarrow \text{C}_2\text{H}_5^+ +$	
03030	Dahler, 62	04248	Burt, 70
03104	Melton, 64	$\text{N}^+ + \text{He} + \text{N}_2 \rightarrow$	
$\text{Kr}^* + \text{Kr} \rightarrow \text{Kr}_2^+ + \text{e}$		03865	Bohme, 69
03104	Melton, 64	04247	Bohme, 69
$\text{Xe}^* + \text{Xe} \rightarrow \text{Xe}_2^+ + \text{e}$		04571	Bohme, 68
03422	Pahl, 68	$\text{N}^+ + \text{N}_2 + \text{N}_2 \rightarrow \text{N}_3^+ +$	
$\text{Hg}^* + \text{Cs} \rightarrow \text{Cs}^+ +$		03409	Mc Knight, 67
04531	Brodskii, 70	03626	Moseley, 69
$\text{Hg}^* + \text{Hg}^* \rightarrow \text{Hg}^+ + \text{e} +$		04252	Good, 70
02395	Biondi, 53	$\text{N}^+ + \text{N}_2 + \text{N}_2 \rightarrow$	
$\text{Hg}^* + \text{Hg}^* \rightarrow \text{Hg}_2^+ + \text{e}$		04571	Bohme, 68
03136	Tan, 68	$\text{N H}_4^+ + \text{H}_2 + \text{N H}_3 \rightarrow \text{N}_2\text{H}_7^+ +$	
		04248	Burt, 70
		$\text{N H}_4^+ + \text{H}_2 + \text{H}_2\text{O} \rightarrow \text{N O H}_6^+ +$	
		04248	Burt, 70



$O_2^+ + O_2 + O_2 \rightarrow O_4^+$		$H_7O_3^+ + Ar + H_2O \rightarrow H_9O_4^+$	
03858 Durden, 69		04592 Fehsenfeld, 71	
04253 Good, 70			
$H_5O_2^+ + H_2 + H_2O \rightarrow H_7O_3^+$		$H_4NO_3^+ + He + H_2O \rightarrow H_6NO_4^+$	
04248 Burt, 70		04592 Fehsenfeld, 71	
$H_5O_2^+ + N_2 + H_2O \rightarrow H_7O_3^+$		$H_4NO_3^+ + N_2 + H_2O \rightarrow H_6NO_4^+$	
04252 Good, 70		04592 Fehsenfeld, 71	
$H_5O_2^+ + H_2O + M \rightarrow H_7O_3^+$		$H_4NO_3^+ + NO + H_2O \rightarrow H_6NO_4^+$	
04580 Young, 70		04251 Puckett, 70	
		04588 Puckett, 71	
$H_5O_2^+ + O_2 + H_2O \rightarrow H_7O_3^+$		04592 Fehsenfeld, 71	
04253 Good, 70			
$C O_2^+ + C O_2 + C O_2 \rightarrow C_2O_4^+$		$H_4NO_3^+ + Ar + H_2O \rightarrow H_6NO_4^+$	
03329 Paulson, 64		04592 Fehsenfeld, 71	
$H_2NO_2^+ + He + H_2O \rightarrow H_4NO_3^+$		$O_4^+ + He + N_2 \rightarrow N_2O_4^+$	
04592 Fehsenfeld, 71		04249 Adams, 70	
$H_2NO_2^+ + N_2 + H_2O \rightarrow H_4NO_3^+$		$O_4^+ + He + O_2 \rightarrow O_6^+$	
04592 Fehsenfeld, 71		04249 Adams, 70	
$H_2NO_2^+ + NO + H_2O \rightarrow H_4NO_3^+$		$H_9O_4^+ + H_2 + H_2O \rightarrow H_{11}O_5^+$	
04251 Puckett, 70		04248 Burt, 70	
04588 Puckett, 71			
04592 Fehsenfeld, 71			
$H_2NO_2^+ + Ar + H_2O \rightarrow H_4NO_3^+$		$H_9O_4^+ + He + H_2O \rightarrow H_{11}O_5^+$	
04592 Fehsenfeld, 71		04592 Fehsenfeld, 71	
$N_2O_2^+ + He + N_2 \rightarrow N_4O_2^+$		$H_9O_4^+ + N_2 + H_2O \rightarrow H_{11}O_5^+$	
04249 Adams, 70		04592 Fehsenfeld, 71	
$N_2O_2^+ + NO + NO \rightarrow N_3O_3^+$		$H_9O_4^+ + O_2 + H_2O \rightarrow H_{11}O_5^+$	
04251 Puckett, 70		04253 Good, 70	
$H_7O_3^+ + H_2 + H_2O \rightarrow H_9O_4^+$		$H_9O_4^+ + Ar + H_2O \rightarrow H_{11}O_5^+$	
04248 Burt, 70		04592 Fehsenfeld, 71	
$H_7O_3^+ + He + H_2O \rightarrow H_9O_4^+$		$Ne^+ + He + He \rightarrow He Ne^+$	
04592 Fehsenfeld, 71		04602 Veatch, 70	
$H_7O_3^+ + N_2 + H_2O \rightarrow H_9O_4^+$		$Ne^+ + He + Ne \rightarrow He Ne^+$	
04252 Good, 70		04602 Veatch, 70	
04592 Fehsenfeld, 71			
$H_7O_3^+ + NO + H_2O \rightarrow H_9O_4^+$		$Ne^+ + He + Ne \rightarrow Ne_2^+$	
04251 Puckett, 70		04602 Veatch, 70	
04588 Puckett, 71			
04592 Fehsenfeld, 71			
$H_7O_3^+ + O_2 + H_2O \rightarrow H_9O_4^+$		$Ne^+ + Ne + Ne \rightarrow Ne_2^+$	
04253 Good, 70		02189 Sauter, 66	
		02981 Beaty, 63	
$H_7O_3^+ + H_2O + M \rightarrow H_9O_4^+$		03030 Dahler, 62	
04580 Young, 70		03210 Beaty, 68	
		03336 Hackam, 66	
		03630 Smith, 68	
		03859 Gaur, 69	
		03860 Chen, 69	

$\text{Na}^+ + \text{He} + \text{H}_2\text{O} \rightarrow \text{Na H}_2\text{O}^+$		$\text{Kr}^+ + \text{He} + \text{Kr} \rightarrow \text{Kr}_2^+$	
04596 Johnsen, 71		00739 Chen, 63	
$\text{Na}^+ + \text{H}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{Na H}_2\text{O}^+$		$\text{Xe}^+ + \text{He} + \text{Xe} \rightarrow \text{Xe}_2^+$	
04596 Johnsen, 71		00739 Chen, 63	
$\text{Na}^+ + \text{Ar} + \text{O}_2 \rightarrow \text{Na O}_2^+$		$\text{Hg}^+ + \text{He} + \text{Hg} \rightarrow \text{Hg}_2^+$	
03405 Ferguson, 68		02395 Biondi, 53	
$\text{Mg}^+ + \text{Ar} + \text{O}_2 \rightarrow \text{Mg O}_2^+$		Three Body, Negative–Neutral–Neutral	
03405 Ferguson, 68			
$\text{Mg}^+ + \text{Ar} + \text{O}_2 \rightarrow$		$\text{O}^- + \text{He} + \text{N}_2 \rightarrow \text{N}_2\text{O}^- +$	
04247 Bohme, 69		04249 Adams, 70	
$\text{Ar}^+ + \text{He} + \text{Ar} \rightarrow \text{Ar}_2^+$		$\text{O}^- + \text{He} + \text{N}_2 \rightarrow$	
04260 Veatch, 70		04247 Bohme, 69	
$\text{Ar}^+ + \text{He} + \text{Ar} \rightarrow$		$\text{O}^- + \text{He} + \text{C O}_2 \rightarrow \text{C O}_3^- +$	
03865 Bohme, 69		04249 Adams, 70	
04247 Bohme, 69			
04571 Bohme, 68		$\text{O}^- + \text{He} + \text{C O}_2 \rightarrow$	
$\text{Ar}^+ + \text{Ar} + \text{Ar} \rightarrow \text{Ar}_2^+$		03865 Bohme, 69	
03030 Dahler, 62		04247 Bohme, 69	
03328 Kebarle, 67		04571 Bohme, 68	
03627 Cronin, 68		$\text{O}^- + \text{O}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{O}_2^- +$	
03630 Smith, 68		04645 Phelps, 70	
03859 Gaur, 69		$\text{O}^- + \text{O}_2 + \text{O}_2 \rightarrow \text{O}_3^- +$	
03860 Chen, 69		03144 Burch, 57	
$\text{K}^+ + \text{He} + \text{H}_2\text{O} \rightarrow \text{K H}_2\text{O}^+$		04259 McKnight, 70	
04596 Johnsen, 71		04389 Snuggs, 71	
$\text{K}^+ + \text{H}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{K H}_2\text{O}^+$		04581 Kinsman, 70	
04596 Johnsen, 71		04645 Phelps, 70	
$\text{K}^+ + \text{C O}_2 + \text{C O}_2 \rightarrow \text{K}^+ +$		04650 Parkes, 71	
04636 Keller, 71		$\text{O}^- + \text{O}_2 + \text{C O}_2 \rightarrow \text{C O}_3^- +$	
		03220 Moruzzi, 66	
$\text{K}^+ + \text{C O}_2 + \text{C O}_2 \rightarrow \text{K C O}_2^+$		$\text{O}^- + \text{C O}_2 + \text{C O}_2 \rightarrow$	
04636 Keller, 71		04571 Bohme, 68	
$\text{K}^+ + \text{Ar} + \text{O}_2 \rightarrow \text{K O}_2^+$		$\text{O}_2^- + \text{He} + \text{N}_2 \rightarrow \text{N}_2\text{O}_2^- +$	
03405 Ferguson, 68		04249 Adams, 70	
$\text{Ca}^+ + \text{Ar} + \text{O}_2 \rightarrow \text{Ca O}_2^+$		$\text{O}_2^- + \text{He} + \text{O}_2 \rightarrow \text{O}_4^- +$	
03405 Ferguson, 68		04249 Adams, 70	
$\text{Ca}^+ + \text{Ar} + \text{O}_2 \rightarrow$		$\text{O}_2^- + \text{He} + \text{C O}_2 \rightarrow \text{C O}_4^- +$	
04247 Bohme, 69		04249 Adams, 70	
$\text{Fe}^+ + \text{Ar} + \text{O}_2 \rightarrow \text{Fe O}_2^+$		$\text{O}_2^- + \text{O}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{O}_3^- +$	
03405 Ferguson, 68		04645 Phelps, 70	
$\text{Fe}^+ + \text{Ar} + \text{O}_2 \rightarrow$		$\text{O}_2^- + \text{O}_2 + \text{O}_2 \rightarrow \text{O}_4^- +$	
04247 Bohme, 69		04598 Mc Knight, 71	
		04645 Phelps, 70	
		04650 Parkes, 71	





Citation List

- 00739 Chen, C. L., Atomic Processes in Helium-Krypton and Helium-Xenon Mixtures, *Phys. Rev.*, *131*, 2550 (1963)
- 02189 Sauter, G. F., Gerber, R. A., Oskam, H. J., Studies of Decaying Plasmas Produced in Neon and Helium-Neon Mixtures, *Physica*, *32*, 1921-1937 (1966)
- 02395 Biondi, M. A., Processes Involving Ions and Metastable Atoms in Mercury Afterglows, *Phys. Rev.*, *90*, 730-737 (1953)
- 02978 Aberth, W. H., Peterson, J. R., Lorents, D. C., Cook, C. J., $N^+ + O^-$ Neutralization Cross-Section Measurements Using a Superimposed-Beam Technique, *Phys. Rev. Letters*, *20*, 979-981 (1968)
- 02979 Baker, C. E., McGuire, J. M., Muschlitz, E. E., Low-Energy Collision Cross Sections of H^- and OH^- Ions in Oxygen, *J. Chem. Phys.*, *37*, 2571-2574 (1962)
- 02980 Beaty, E. C., Patterson, P. L., Mobilities and Reaction Rates of Ions in Helium, *Phys. Rev.*, *137*, A346-357 (1965)
- 02981 Beaty, E. C., Patterson, P. L., Reaction Rates for the Formation of He_2^+ and Ne_2^+ , (In) Proceedings of the Sixth International Conference on Ionization Phenomena in Gases (Paris, 8-13 July 1963); P. Hubert and E. Cremieu-Alcan, Editors, Serma, Paris, *1*, 289-293 (1963)
- 02982 Becker, P. M., Lampe, F. W., Mass-Spectrometric Study of the Bimolecular Formation of Diatomic Argon Ion, *J. Chem. Phys.*, *42*, 3857-3863 (1965)
- 02984 Bloomfield, C. H., Hasted, J. B., New Technique for the Study of Ion-Atom Interchange, *Discussions Faraday Soc.*, *37*, 176-184 (1964)
- 02985 Bohme, D. K., Ong, P. P., Hasted, J. B., Megill, L. R., Energy Dependence of Reactions O^+ with N_2 , O_2-I , *Planetary Space Sci.*, *15*, 1777-1780 (1967)
- 03028 Chupka, W. A., Russell, M. E., Ion-Molecule Reactions of NH_3^+ by Photoionization, *J. Chem. Phys.*, *48*, 1527-1533 (1968)
- 03029 Chupka, W. A., Russell, M. E., Refaey, K., Ion-Molecule and Chemi-Ionization Reactions in H_2 by Photoionization, *J. Chem. Phys.*, *48*, 1518-1527 (1968)
- 03030 Dahler, J. S., Franklin, J. L., Munson, M. S. B., Field, F. H., Rare-Gas Molecule-Ion Formation by Mass Spectrometry. Kinetics of Ar_2^+ , Ne_2^+ , and He_2^+ Formation by Second- and Third-Order Processes, *J. Chem. Phys.*, *36*, 3332-3344 (1962)
- 03031 Derwish, G. A. W., Galli, A., Giardini-Guidoni, A., Volpi, G. G., Ion-Molecule Reactions in Methane and in Ethane, *J. Chem. Phys.*, *40*, 5-12 (1964)
- 03032 Derwish, G. A. W., Galli, A., Giardini-Guidoni, A., Volpi, G. G., High-Pressure Mass Spectrum of N_2O , *J. Chem. Phys.*, *40*, 3450-3451 (1964)

- 03033 Edmonds, P. H., Hasted, J. B., A Near-Resonance Charge Transfer Process, Proc. Phys. Soc. London, 84, 99–109 (1964)
- 03034 Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Correction in the Laboratory Measurement of the Rate Constant for $N_2^+ + O_2 \Rightarrow N_2 + O_2^+$ at 300°K, Planetary Space Sci., 13, 919–920 (1965)
- 03036 Fehsenfeld, F. C., Goldan, P. D., Schmeltekopf, A. L., Ferguson, E. E., Laboratory Measurement of the Rate of the Reaction $O^+ + O_2 \Rightarrow O_2^+ + O$ at Thermal Energy, Planetary Space Sci., 13, 579–582 (1965)
- 03037 Fehsenfeld, F. C., Schmeltekopf, A. L., Goldan, P. D., Schiff, H. I., Ferguson, E. E., Thermal Energy Ion-Neutral Reaction Rates. I. Some Reactions of Helium Ions, J. Chem. Phys., 44, 4087–4094 (1966)
- 03038 Fehsenfeld, F. C., Ferguson, E. E., Schmeltekopf, A. L., Thermal-Energy Ion-Neutral Reaction Rates III. The Measured Rate Constant for the Reaction $O^+(^4S) + CO_2(^1\Sigma) \Rightarrow O_2 + (^2) + CO(^1\Sigma)$, J. Chem. Phys., 44, 3022–3024 (1966)
- 03039 Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Thermal Energy Ion-Neutral Reaction Rates. IV. Nitrogen Ion Charge-Transfer Reactions with CO and CO_2 , J. Chem. Phys., 44, 4537–4538 (1966)
- 03040 Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Thermal-Energy Ion-Neutral Reaction Rates. V. Measured Rate Constants for C^+ and CO^+ Reactions with O_2 and CO_2 , J. Chem. Phys., 45, 23–25 (1966)
- 03041 Fehsenfeld, F. C., Ferguson, E. E., Schmeltekopf, A. L., Thermal-Energy Ion-Neutral Reaction Rates. VI. Some Ar^+ Charge-Transfer Reactions, J. Chem. Phys., 45, 404–405 (1966)
- 03042 Fehsenfeld, F. C., Ferguson, E. E., Schmeltekopf, A. L., Thermal-Energy Associative-Detachment Reactions of Negative Ions, J. Chem. Phys., 45, 1844–1845 (1966)
- 03043 Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Thermal-Energy Ion-Neutral Reaction Rates. VII. Some Hydrogen-Atom Abstraction Reactions, J. Chem. Phys., 46, 2802–2808 (1967)
- 03044 Fehsenfeld, F. C., Schmeltekopf, A. L., Schiff, H. I., Ferguson, E. E., Laboratory Measurements of Negative Ion Reactions of Atmospheric Interest, Planetary Space Sci., 15, 373–379 (1967)
- 03046 Ferguson, E. E., Fehsenfeld, F. C., Goldan, P. D., Schmeltekopf, A. L., Schiff, H. I., Laboratory Measurement of the Rate of the Reaction $N_2^+ + O \Rightarrow NO^+ + N$ at Thermal Energy, Planetary Space Sci., 13, 823–827 (1965)
- 03047 Fisk, B. A., Mahan, B. H., Parks, E. K., Gaseous Ion Recombination Rates. IV, J. Chem. Phys., 47, 2649–2658 (1967)
- 03048 Fite, W. L., Rutherford, J. A., Snow, W. R., Van Lint, V. A. J., Ion-Neutral Collisions in Afterglows, Discussions Faraday Soc., 33, 264–272 (1962)

- 03049 Fite, W. L., Smith, A. C. H., Stebbings, R. F., Rutherford, J. A., Collisions Between He^+ and O_2 , *J. Geophys. Res.*, **68**, 3225–3229 (1963)
- 03072 Reuben, B. G., Friedman, L., Isotopic Hydrogen–Ion–Molecule Reactions, *J. Chem. Phys.*, **37**, 1636–1642 (1962)
- 03074 Giardini–Guidoni, A., Volpi, G. G., Ion–Molecules Reactions of the Fifth Group Element Hydrides, *Nuovo Cimento*, **17**, 919–927 (1960)
- 03075 Giardini–Guidoni, A., Friedman, L., Energy Transfer in Ion–Molecule Reactions in the Methane System, *J. Chem. Phys.*, **45**, 937–943 (1966)
- 03076 Giese, C. F., Maier, W. B., Dissociative Ionization of CO by Ion Impact, *J. Chem. Phys.*, **39**, 197–200 (1963)
- 03077 Giese, C. F., Maier, W. B., Energy Dependence of Cross Sections for Ion–Molecule Reactions. Transfer of Hydrogen Atoms and Hydrogen Ions, *J. Chem. Phys.*, **39**, 739–748 (1963)
- 03078 Roth, W., Charge Transfer Cross Section for Electronically Excited N_2^+ with O Atoms at Low Energy, *J. Chem. Phys.*, **37**, 925–926 (1962)
- 03079 Rozett, R. W., Koski, W. S., Helium Ion–Hydrogen Reactions, *J. Chem. Phys.*, **48**, 533–534 (1968)
- 03080 Goldan, P. D., Schmeltekopf, A. L., Fehsenfeld, F. C., Schiff, H. I., Ferguson, E. E., Thermal Energy Ion–Neutral Reaction Rates. II. Some Reactions of Ionospheric Interest, *J. Chem. Phys.*, **44**, 4095–4103 (1966)
- 03081 Greaves, C., Ion–Ion Recombination in Iodine Afterglows, *J. Electron Control*, **17**, 171–180 (1964)
- 03082 Gutbier, H., Massenspektrometrische Untersuchung der Reaktion $\text{X}^+ + \text{H}_2 \rightarrow \text{HX}^+ + \text{H}$, *Z. Naturforsch.*, **12A**, 499–507 (1957)
- 03083 Harrison, A. G., Myher, J. J., Ion–Molecule Reactions in Mixtures with D_2 or CD_4 , *J. Chem. Phys.*, **46**, 3276–3277 (1967)
- 03084 Hand, C. W., Von Weyssenhoff, H., Ion–Molecule Reactions Studied by Time-of-Flight Mass Spectrometry. II. Reactions in $\text{CO}-\text{D}_2$ and CH_4-D_2 Mixtures, *Can. J. Chem.*, **42**, 2385–2392 (1964)
- 03085 Henglein, A., Muccini, G. A., Negative Ion–Molecule Reactions, *J. Chem. Phys.*, **31**, 1426–1427 (1959)
- 03086 Herman, Z., Cermak, V., Ion–Molecule Reactions in Mixtures of Gases with Alkali Metal and Mercury Vapour, *Collection Czech. Chem. Commun.*, **30**, 2114–2117 (1965)
- 03087 Rutherford, J. A., Turner, B. R., The Production of NO_2^- by Electron Transfer from O^- , O_2^- , O_3^- , and $\text{OH}^- \Rightarrow \text{NO}_2$, *J. Geophys. Res.*, **72**, 3795–3800 (1967)

- 03088 Hess, G. G., Lampe, F. W., Ionic Reactions in Gaseous Monosilane, *J. Chem. Phys.*, **44**, 2257–2261 (1966)
- 03089 Aquilanti, V., Volpi, G. G., Ion–Molecule Reactions Between H_3^+ and Saturated Hydrocarbons, *J. Chem. Phys.*, **44**, 2307–2313 (1966)
- 03090 Hotop, H., Niehaus, A., Collisional Ionization of Long-Lived Highly Excited Atoms, *J. Chem. Phys.*, **47**, 2506–2507 (1967)
- 03091 Ryan, K. R., Futrell, J. H., Effect of Translational Energy on Ion–Molecule Reaction Rates. I., *J. Chem. Phys.*, **42**, 824–829 (1965)
- 03092 Ryan, K. R., Futrell, J. H., Miller, C. D., Method for Studying Low Energy Ion–Molecule Reactions Using Monoenergetic Ions, *Rev. Sci. Instr.*, **37**, 107–110 (1966)
- 03093 Koyano, I., Omura, I., Tanaka, I., Ion–Molecule Reactions by a Photoionization Mass Spectrometer. I. Propylene and 1, 3–Butadiene, *J. Chem. Phys.*, **44**, 3850–3855 (1966)
- 03094 Koyano, I., Ion–Molecule Reactions by a Photoionization Mass Spectrometer. II. Butene–1, Butene–2, and Isobutylene, *J. Chem. Phys.*, **45**, 706–708 (1966)
- 03095 Aquilanti, V., Volpi, G. G., Proton Transfer from H_3^+ to Unsaturated Hydrocarbons and to Cyclopropane, *J. Chem. Phys.*, **44**, 3574–3580 (1966)
- 03096 Lampe, F. W., Field, F. H., Franklin, J. L., Reactions of Gaseous Ions. IV. Water, *J. Am. Chem. Soc.*, **79**, 6132–6135 (1957)
- 03097 Aquilanti, V., Galli, A., Giardini–Guidoni, A., Volpi, G. G., Ion–Molecule Reactions in Hydrogen Rare–Gas Mixtures, *J. Chem. Phys.*, **43**, 1969–1973 (1965)
- 03098 Lee, Y., Mahan, B. H., Mobilities of Cesium and Rubidium Ions in Their Parent Vapors, *J. Chem. Phys.*, **43**, 2016–2019 (1965)
- 03099 Leventhal, J. J., Moran, T. F., Friedman, L., Molecular Resonant Charge–Transfer Processes; $\text{H}_2^+–\text{H}_2$ and $\text{N}_2^+–\text{N}_2$, *J. Chem. Phys.*, **46**, 4666–4672 (1967)
- 03100 Maier, W. B., Dissociative Ionization of N_2 and N_2O by Rare–Gas Ion Impact, *J. Chem. Phys.*, **41**, 2174–2181 (1964)
- 03101 Maier, W. B., Dissociative Ionization of Molecules by Rare–Gas Ion Impact, *J. Chem. Phys.*, **42**, 1790–1804 (1965)
- 03102 Maier, W. B., Atom Transfer in Endothermic Ion–Molecule Reactions, *J. Chem. Phys.*, **46**, 4991–4992 (1967)
- 03103 Martin, T. W., Melton, C. E., Hydrogen Atom Abstraction Reactions by Cyanide Ion–Radicals, *J. Chem. Phys.*, **32**, 700–704 (1960)
- 03104 Melton, C. E., Hamill, W. H., Appearance Potentials by the Retarding Potential–Difference Method for Secondary Ions Produced by Excited–Neutral, Excited Ion–Neutral, and Ion–Neutral Reactions, *J. Chem. Phys.*, **41**, 1469–1474 (1964)

- 03105 Miller, T. M., Moseley, J. T., Martin, D. W., McDaniel, E. W., Reactions of H⁺ in H₂ and D⁺ in D₂; Mobilities of Hydrogen and Alkali Ions in H₂ and D₂ Gases, Phys. Rev., 173, 115–123 (1968)
- 03106 Moran, T. F., Friedman, L., Neon–Hydrogen Ion–Molecule Reactions, J. Chem. Phys., 39, 2491–2500 (1963)
- 03107 Saporoschenko, M., Formation of H₃⁺ and H₅⁺ Ions, J. Chem. Phys., 42, 2760–2764 (1965)
- 03108 Saporoschenko, M., Mobility of Mass-Analyzed N⁺, N₂⁺, N₃⁺, and N₄⁺ Ions in Nitrogen Gas, Phys. Rev., 139, A352–356 (1965)
- 03109 Munson, M. S. B., Field, F. H., Franklin, J. L., Reactions of Gaseous Ions. XIII. The System Methane–Hydrogen, J. Am. Chem. Soc., 85, 3584–3588 (1963)
- 03110 Munson, M. S. B., Field, F. H., Franklin, J. L., High-Pressure Mass Spectrometric Study of Reactions of Rare Gases with N₂ and CO, J. Chem. Phys., 37, 1790–1799 (1962)
- 03112 Nakshbandi, M. M., Hasted, J. B., Energy Dependence of Reactions of O⁺ with N₂, O₂—II. Afterglow Measurements, Planetary Space Sci., 15, 1781–1786 (1967)
- 03113 Neynaber, R. H., Trujillo, S. M., Study of H₂⁺+H₂ \Rightarrow H₃⁺ + H Using Merging Beams, Phys. Rev., 167, 63–66 (1968) and 171, 282 (1968) Erratum
- 03114 Neynaber, R. H., Trujillo, S. M., Rothe, E. W., Symmetric–Resonance Charge Transfer in Ar from 0.1–20 eV Using Merging Beams, Phys. Rev., 157, 101–102 (1967)
- 03115 Niles, F. E., Robertson, W. W., Temperature Dependence of the Rate of Conversion of He⁺ into He₂⁺, J. Chem. Phys., 42, 3277–3280 (1965)
- 03116 Ortenburger, I. B., Hertzberg, M., Ogg, R. A., Secondary Reactions in a Gas Discharge, J. Chem. Phys., 33, 579–583 (1960)
- 03117 Oskam, H. J., Mittelstadt, V. R., Ion Mobilities in Helium, Neon, and Argon, Phys. Rev., 132, 1435–1444 (1963)
- 03118 Paulson, J. F., Mosher, R. L., Dale, F., Fast Ion–Molecule Reaction in CO₂, J. Chem. Phys., 44, 3025–3028 (1966)
- 03119 Sayers, J., Smith, D., Ion and Charge Exchange Reactions Involving Atmospheric Gases, Discussions Faraday Soc., 37, 167–175 (1964)
- 03120 Schissler, D. O., Stevenson, D. P., Reactions of Gaseous Molecule Ions with Gaseous Molecules. II, J. Chem. Phys., 24, 926 (1956)
- 03121 Schmeltekopf, A. L., Fehsenfeld, F. C., Ferguson, E. E., Laboratory Measurement of the Rate Constant for H[−] + H \Rightarrow H₂ + e, Astrophys. J., 148, L155–156 (1967)
- 03122 Schmeltekopf, A. L., Fehsenfeld, F. C., Gilman, G. I., Ferguson, E. E., Reaction of Atomic Oxygen Ions with vibrationally Excited Nitrogen Molecules, Planetary Space Sci., 15, 401–406 (1967)

- 03123 Shahin, M. M., Use of Corona Discharges for the Study of Ion-Molecule Reactions, *J. Chem. Phys.*, **47**, 4392–4398 (1967)
- 03124 Shannon, T. W., Meyer, F., Harrison, A. G., A Pulsed Ion Source for the Study of Unimolecular and Bimolecular Reactions of Gas-Phase Ions, *Can. J. Chem.*, **43**, 159–174 (1965)
- 03125 Shannon, T. W., Harrison, A. G., Concurrent Ion-Molecule Reactions. I. Reactions in X-CD₄ Mixtures, *J. Chem. Phys.*, **43**, 4201–4206 (1965)
- 03126 Sieck, L. W., Futrell, J. H., Reactions of C₃H₆⁺ with C₃ and C₄ Paraffins, *J. Chem. Phys.*, **45**, 560–564 (1966)
- 03127 Sieck, L. W., Futrell, J. H., Rate Constants for Charge Exchange Involving Quasithermal Ions and Nitric Oxide, *J. Chem. Phys.*, **48**, 1409–1410 (1968)
- 03128 Smith, D., Fouracre, R. A., The Temperature Dependence of the Reaction Rate Coefficients of O⁺ Ions with Molecular Oxygen and Nitrogen, *Planetary Space Sci.*, **16**, 243–252 (1968)
- 03129 Stebbings, R. F., Rutherford, J. A., Turner, B. R., Loss of He⁺ Ions in the Upper Atmosphere, *Planetary Space Sci.*, **13**, 1125–1129 (1965)
- 03130 Stebbings, R. F., Rutherford, J. A., Low-Energy Collisions Between O^{+(4S)} and H(1s), *J. Geophys. Res.*, **73**, 1035–1058 (1968)
- 03131 Stebbings, R. F., Turner, B. R., Rutherford, J. A., Low-Energy Collisions Between Some Atmospheric Ions and Neutral Particles, *J. Geophys. Res.*, **71**, 771–784 (1966)
- 03132 Stevenson, D. P., Schissler, D. O., Rate of the Gaseous Reactions, X⁺ + YH=XH⁺ + Y, *J. Chem. Phys.*, **23**, 1353–1354 (1955)
- 03133 Stevenson, D. P., Schissler, D. O., Reactions of Gaseous Molecule Ions with Gaseous Molecules. IV. Experimental Method and Results, *J. Chem. Phys.*, **29**, 282–294 (1958)
- 03134 Talrose, V. L., Frankevich, E. L., Impulse Method for Determining the Rate Constants of Elementary Ion-Molecule Reactions, *Zh. Fiz. Khim.*, **34**, 2709–2718 (1960)
- 03135 Talrose, V. L., Markin, M. I., Larin, I. K., The Reaction O⁺ + N₂→NO⁺ + N, *Discussions Faraday Soc.*, **33**, 257–263 (1962)
- 03136 Tan, K. L., Von Engel, A., Measurement of the Associative Ionization Cross Section of Mercury Vapour, *Brit. J. Appl. Phys. J. Phys. D*, **1**, 258–259 (1968)
- 03137 Teter, M. P., Niles, F. E., Robertson, W. W., Hornbeck-Molnar Cross Sections for the n=3 States of Helium, *J. Chem. Phys.*, **44**, 3018–3021 (1966)
- 03138 Turner, B. R., Fineman, M. A., Stebbings, R. F., Crossed-Beam Investigation of N₂D⁺ Production in N₂⁺-D₂ Collisions, *J. Chem. Phys.*, **42**, 4088–4096 (1965)

- 03139 Turner, B. R., Rutherford, J. A., Stebbings, R. F., Charge Transfer Reactions of Nitric Oxide with Atomic and Molecular Ions of Oxygen and Nitrogen, *J. Geophys. Res.*, **71**, 4521–4525 (1966)
- 03140 Vance, D. W., Bailey, T. L., Inelastic Collisions of H_2^+ and N_2^+ Ions with Hydrogen Molecules, *J. Chem. Phys.*, **44**, 486–493 (1966)
- 03141 Warneck, P., Studies of Ion–Neutral Reactions by a Photoionization Mass–Spectrometer Technique. IV. Reactions of He^+ with N_2 and O_2 , *J. Chem. Phys.*, **47**, 4279–4281 (1967)
- 03142 Weingartshofer, A., Clarke, E. M., Cross Sections for the Ion–Molecule Reaction $\text{H}_2^{++} + \text{H} \Rightarrow \text{H}_3^+ + \text{H}$ as a Function of the Vibration State of the H_2^+ Ion, *Phys. Rev. Letters*, **12**, 591–592 (1964)
- 03143 Batey, P. H., Court, G. R., Sayers, J., Afterglow Measurements of the Rate Coefficients for the Reactions $\text{O}^+ + \text{O}_2 \Rightarrow \text{O}_2^+ + \text{O}$ and $\text{O}^+ + \text{N}_2 \Rightarrow \text{NO}^+ + \text{N}$, *Planetary Space Sci.*, **13**, 911–917 (1965)
- 03144 Burch, D. S., Geballe, R., Clustering of Negative Ions in Oxygen, *Phys. Rev.*, **106**, 188–190 (1957)
- 03145 Carlton, T. S., Mahan, B. H., Gaseous Ion Recombination Rates. III, *J. Chem. Phys.*, **40**, 3683–3687 (1964)
- 03146 Colgate, S. O., Schmidt, T. W., Energy–Dependence Measurement of the $\text{CH}_4^+ + \text{CH}_4 = \text{CH}_3 + \text{CH}_5^+$ Reaction Cross Section, *J. Chem. Phys.*, **45**, 367–369 (1966)
- 03148 Copsey, M. J., Smith, D., Sayers, J., Laboratory Afterglow Studies of O^+ Ions in Helium–Oxygen and Helium–Oxygen–Nitrogen Mixtures, *Planetary Space Sci.*, **14**, 1047–1055 (1966)
- 03149 Cramer, W. H., Elastic and Inelastic Scattering of Low–Velocity H^+ and H_2^+ in Hydrogen, *J. Chem. Phys.*, **35**, 836–838 (1961)
- 03150 Cress, M. C., Becker, P. M., Lampe, F. W., Pulsed–Mass–Spectrometric Study of the Bimolecular Formation of N_3^+ , *J. Chem. Phys.*, **44**, 2212–2213 (1966)
- 03151 Fehsenfeld, F. C., Ferguson, E. E., Further Laboratory Measurements of Negative Reactions of Atmospheric Interest, *Planetary Space Sci.*, **16**, 701–702 (1968)
- 03152 Field, F. H., Franklin, J. L., Lampe, F. W., Reactions of Gaseous Ions. II. Acetylene, *J. Am. Chem. Soc.*, **79**, 2665–2669 (1957)
- 03153 Friedman, L., Moran, T. F., Small–Cross–Section Exothermic Ion–Molecule Reactions. $\text{He}^+ - \text{H}_2$, $\text{Ne}^+ - \text{H}_2$, *J. Chem. Phys.*, **42**, 2624–2625 (1956)
- 03154 Phelps, A. V., Pack, J. L., Collisional Detachment in Molecular Oxygen, *Phys. Rev. Letters*, **6**, 111–113 (1961)

- 03189 Field, F. H., Lampe, F. W., Reactions of Gaseous Ions. V. Methane-Hydrogen Chloride and Methane-Hydrogen Sulfide, *J. Am. Chem. Soc.*, **80**, 5583-5586 (1958)
- 03190 Melton, C. E., Charge Transfer Reactions Producing Intrinsic Chemical Change: Methyl, Methylene, and Hydrogen Radicals Produced from Argon and Methane Reactions, *J. Chem. Phys.*, **33**, 647-651 (1960)
- 03191 Sholette, W. P., Muschlitz, E. E., Ionizing Collisions of Metastable Helium Atoms in Gases, *J. Chem. Phys.*, **36**, 3368-3373 (1962)
- 03192 Maier, W. B., Is N_3^- Produced in Reactions Between N_2^+ and N_2 ?, *J. Chem. Phys.*, **47**, 859-860 (1967)
- 03193 Warneck, P., Studies of Ion-Neutral Reactions by a Photoionization Mass-Spectrometer Technique. I., *J. Chem. Phys.*, **46**, 502-512 (1967)
- 03194 Warneck, P., Studies of Ion-Neutral Reactions by a Photoionization Mass-Spectrometer Technique. II. Charge-Transfer Reactions of Argon Ions at Near-Thermal Energies, *J. Chem. Phys.*, **46**, 513-519 (1967)
- 03195 Aquilanti, V., Volpi, G. G., Some Ionic Processes of Interest in the Upper Atmosphere, *Ric. Sci.*, **36**, 359-364 (1966)
- 03196 Leventhal, J. J., Friedman, L., Diatomic-Ion-Molecule Reactions: $N_2^+-N_2$, CO^+-CO , and $O_2^+-O_2$, *J. Chem. Phys.*, **46**, 997-1005 (1967)
- 03197 Moran, T. F., Friedman, L., Exothermic Ion-Molecule Reactions, *J. Chem. Phys.*, **45**, 3837-3845 (1966)
- 03198 Kubose, D. A., Hamill, W. H., Velocity Dependence of Ion-Molecule Reaction Cross Sections in a Mass Spectrometer, *J. Am. Chem. Soc.*, **85**, 125-127 (1963)
- 03199 Franklin, J. L., Field, F. H., Reactions of Gaseous Ions. IX. Charge Exchange Reactions of Rare Gas Ions with Ethylene, *J. Am. Chem. Soc.*, **83**, 3555-3559 (1961)
- 03200 Field, F. H., Franklin, J. L., Lampe, F. W., Reactions of Gaseous Ions. I. Methane and Ethylene, *J. Am. Chem. Soc.*, **79**, 2419-2429 (1957)
- 03201 Herman, Z., Cermak, V., Mass Spectrometric Investigation of the Reactions of Ions and Excited Neutral Particles in Mixtures Containing Mercury Vapour, *Collection Czech. Chem. Commun.*, **28**, 799-807 (1963)
- 03210 Beaty, E. C., Patterson, P. L., Mobilities and Reaction Rates of Neon Ions in Neon, *Phys. Rev.*, **170**, 116-121 (1968)
- 03218 Homer, J. B., Lehrle, R. S., Robb, J. C., Thomas, D. W., Gas-Phase Ion-Molecule Interactions Involving Atom Transfer; Limitations of the Orbiting Theory in Accounting for the Variation of Cross-Section with Energy, *Nature*, **202**, 795-797 (1964)

- 03219 Field, F. H., Reactions of Gaseous Ions. VIII. Multiple Order Ion-Molecule Reactions and the Ultra-High Pressure Mass Spectrum of Ethylene, *J. Am. Chem. Soc.*, **83**, 1523–1534 (1961)
- 03220 Moruzzi, J. L., Phelps, A. V., Survey of Negative-Ion-Molecule Reactions in O₂, CO₂, H₂O, CO, and Mixtures of these Gases at High Pressures, *J. Chem. Phys.*, **45**, 4617–4627 (1966)
- 03221 Harrison, A. G., Ivko, A., Shannon, T. W., Reactions of Thermal Energy Ions. II. Rates of Some Hydrogen Transfer Ion-Molecule Reactions, *Can. J. Chem.*, **44**, 1351–1359 (1966)
- 03222 Potter, R. F., Cross Sections for Charge Transfer Collisions of Low-Energy Ions in N₂ and O₂, *J. Chem. Phys.*, **22**, 974–979 (1954)
- 03223 Wexler, S., Jesse, N., Consecutive Ion-Molecule Reactions in Methane, *J. Am. Chem. Soc.*, **84**, 3425–3432 (1962)
- 03224 Field, F. H., Head, H. N., Franklin, J. L., Reactions of Gaseous Ions. XI. Ionic Reactions in Krypton-Methane and Argon-Methane Mixtures, *J. Am. Chem. Soc.*, **84**, 1118–1122 (1962)
- 03225 Dorfman, L. M., Noble, P. C., Reactions of Gaseous Ions. Ammonium Ion Formation in Ionized Ammonia, *J. Phys. Chem.*, **63**, 980–982 (1959)
- 03226 Hand, C. W., Von Weyssenhoff, H., Ion-Molecule Reactions Studied by Time-of-Flight Mass Spectrometry, *Can. J. Chem.*, **42**, 195–197 (1964)
- 03324 Weiner, E. R., Hertel, G. R., Koski, W. S., Gas Phase Reactions Between Carbon Tetrachloride and Mass Analyzed Ions of Nitrogen Between 3 and 200 eV, *J. Am. Chem. Soc.*, **86**, 788–793 (1964)
- 03325 Hertel, G. R., Koski, W. S., Ion-Molecule Reactions between Rare Gas Ions and Methane, *J. Am. Chem. Soc.*, **87**, 1686–1691 (1965)
- 03326 Cramer, W. H., Elastic and Inelastic Scattering of Low-Velocity Ions: Ne⁺ in A, A⁺ in Ne, and A⁺ in A, *J. Chem. Phys.*, **30**, 641–642 (1959)
- 03327 Barker, R., Hamill, W. H., Williams, R. R., Ion-Molecule Reactions of 1,3-Butadiene, of Acetylene and of Acetylene-Methane Mixtures, *J. Phys. Chem.*, **63**, 825–828 (1958)
- 03328 Kobarle, P., Haynes, R. M., Seales, S. K., Mass-Spectrometric Study of Ions in Xe, Kr, Ar, Ne at Pressures up to 40 torr: Termolecular Formation of the Rare-Gas Molecular Ions. Bond Dissociation Energy of Ar₂⁺ and Ne₂⁺, *J. Chem. Phys.*, **47**, 1684–1691 (1967)
- 03329 Paulson, J. F., Dale, F., Mosher, R. L., Production of C₂O₄⁺ in an Ion-Molecule Reaction, *Nature*, **204**, 377–378 (1964)

- 03330 Von Koch, H., Friedman, L., Hydrogen–Helium Ion–Molecule Reactions, *J. Chem. Phys.*, **38**, 1115–1122 (1963)
- 03331 Vogt, D., Neuert, H., Über Die Energieabhängigkeit Von Ionen–Molekul Reaktionen Mit Negativen Ionen, *Z. Physik*, **199**, 82–87 (1967)
- 03332 Theard, L. P., Hamill, W. H., The Energy Dependence of Cross Sections of Some Ion–Molecule Reactions, *J. Am. Chem. Soc.*, **84**, 1134–1139 (1962)
- 03333 Boelrijk, N., Hamill, W. H., Effects of Relative Velocity Upon Gaseous Ion–Molecule Reactions. Charge Transfer to the Neopentane Molecule, *J. Am. Chem. Soc.*, **84**, 730–734 (1962)
- 03334 Pottie, R. F., Lorquet, A. J., Hamill, W. H., The Energy Dependence for Reaction Cross Sections of Ion–Molecule Reactions of Cyclopropane in the Mass Spectrometer, *J. Am. Chem. Soc.*, **84**, 529–531 (1962)
- 03335 Berta, M. A., Koski, W. S., The Argon–Deuterium Hydride Ion Reaction, *J. Am. Chem. Soc.*, **86**, 5098–5101 (1964)
- 03336 Hackam, R., Temperature Variation of Positive Ion Mobilities and Conversion Rates in Neon, *Brit. J. Appl. Phys.*, **17**, 197–205 (1966)
- 03351 Hackam, R., Lennon, J. J., Positive Ion Mobilities and Conversion Rates in a Helium Afterglow, *Proc. Phys. Soc. London*, **84**, 133–139 (1964)
- 03352 Moruzzi, J. L., Ekin, J. W., Phelps, A. V., Electron Production by Associative Detachment of O^- Ions with NO, CO, and H_2 , *J. Chem. Phys.*, **48**, 3070–3076 (1968)
- 03353 Utterback, N. G., Van Zyl, B., Enhancement of Neutral–Neutral Ionization Processes by Internal Excitation Energy in the Colliding Particles, *Phys. Rev. Letters*, **20**, 1021–1024 (1968)
- 03354 Schmeltekopf, A. L., Ferguson, E. E., Fehsenfeld, F. C., Afterglow Studies of the Reactions He^+ , $He(2^3S)$, and O^+ with vibrationally excited N_2 , *J. Chem. Phys.*, **48**, 2966–2973 (1968)
- 03355 Maier, W. B., Reactions of He^+ with N_2 and O_2 in the Upper Atmosphere, *Planetary Space Sci.*, **16**, 477–493 (1968)
- 03356 Benton, E. E., Ferguson, E. E., Matsen, F. A., Robertson, W. W., Cross Sections for the De–Excitation of Helium Metastable Atoms by Collisions with Atoms, *Phys. Rev.*, **128**, 206–209 (1962)
- 03357 Dillard, J. G., Franklin, J. L., Ion–Molecule Reactions of Negative Ions. I. Negative Ions of Sulfur, *J. Chem. Phys.*, **48**, 2349–2352 (1968)

- 03358 Warneck, P., Studies of Ion-Neutral Reactions by a Photoionization-Mass Spectrometer Technique III. Several Ionospheric Reactions, *Planetary Space Sci.*, **15**, 1349-1359 (1967)
- 03359 Derwish, G. A. W., Galli, A., Giardini-Guidoni, A., Volpi, G. G., Mass-Spectrometric Study of Ion-Molecule Reactions in Propane, *J. Chem. Phys.*, **41**, 2998-3005 (1964)
- 03360 Thynne, J. C. J., Harrison, A. G., Reactions of Thermal Energy Ions. Part 3. Ion-Molecule Reactions in H₂O and D₂O, *Trans. Faraday Soc.*, **62**, 2468-2475 (1966)
- 03361 Biondi, M. A., Diffusion, De-Excitation, and Ionization Cross Sections for Metastable Atoms. I., *Phys. Rev.*, **88**, 660-665 (1952)
- 03362 Mahadevan, P., Magnuson, G. D., Low-Energy (1- to 100-eV) Charge-Transfer Cross-Section Measurements for Noble-Gas-Ion Collisions with Gases, *Phys. Rev.*, **171**, 103-109 (1968)
- 03363 Pritchard, H., Harrison, A. G., Ion-Molecule Reactions of Oxygenated Species. Proton-Transfer Reactions Involving CHO⁺, *J. Chem. Phys.*, **48**, 5623-5630 (1968)
- 03364 Shannon, T. W., Harrison, A. G., Concurrent Ion-Molecule Reactions. II. Reactions in X-D₂ Mixtures, *J. Chem. Phys.*, **43**, 4206-4212 (1965)
- 03365 Kushnir, R. M., Palyukh, B. M., Sena, L. A., Investigation of Resonance Charge Exchange in Monatomic Gases and Metal Vapors, *Bull. Acad. Sci. USSR English Transl.*, **23**, 995-999 (1959)
- 03366 Derwish, G. A. W., Galli, A., Giardini-Guidoni, A., Volpi, G. G., Ion-Molecule Reactions in Gaseous Ammonia, *J. Chem. Phys.*, **39**, 1599-1605 (1963)
- 03367 Foner, S. N., Hudson, R. L., Mass Spectrometry of the HO₂ Free Radical, *J. Chem. Phys.*, **36**, 2681-2688 (1962)
- 03368 Saporoschenko, M., Mobility of CO⁺, CO₂⁺, and C₂O₂⁺ Ions in Carbon Monoxide Gas, *J. Chem. Phys.*, **49**, 768-774 (1968)
- 03369 Belyaev, V. A., Brezhnev, B. G., Erastov, E. M., Resonance Charge Exchange of Protons and Deuterons at Low Energies, *Soviet Phys. JETP English Transl.*, **25**, 777-782 (1967)
- 03403 Varney, R. N., Equilibrium Constant and Rates for the Reversible Reaction N₄⁺ \rightleftharpoons N₂⁺ + N₂, *Phys. Rev.*, **174**, 165-172 (1968)
- 03405 Ferguson, E. E., Fehsenfeld, F. C., Some Aspects of the Metal Ion Chemistry of the Earth's Atmosphere, *J. Geophys. Res.*, **73**, 6215-6223 (1968)
- 03406 Rol, P. K., Entemann, E. A., NaO⁺ Production from Na and O₂⁺ in Merged Beams, *J. Chem. Phys.*, **49**, 1430-1431 (1968)
- 03407 Dunkin, D. B., Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Ion-Molecule Reaction Studies from 300° to 600° K in a Temperature-Controlled Flowing Afterglow System, *J. Chem. Phys.*, **49**, 1365-1371 (1968)

- 03408 Leventhal, J. J., Friedman, L., Charge Transfer and Proton Transfer in Polyatomic Ion-Molecule Systems, *J. Chem. Phys.*, **48**, 1559–1570 (1968)
- 03409 McKnight, L. G., McAfee, K. B., Sipler, D. P., Low-Field Drift Velocities and Reactions of Nitrogen Ions in Nitrogen, *Phys. Rev.*, **164**, 62–70 (1967)
- 03420 Henglein, A., Lacmann, K., Knoll, B., On the Collision Mechanism of Bimolecular Reactions. IV. Intramolecular Isotope and Stripping Effects in the Reactions of Ar^+ and of N_2^+ Ions with HD, *J. Chem. Phys.*, **43**, 1048–1049 (1965)
- 03421 Field, F. H., Franklin, J. L., Lampe, F. W., Gas Phase Ionic Reactions. Methane and Ethylene, *J. Am. Chem. Soc.*, **78**, 5697–5698 (1956)
- 03422 Pahl, M., Zur Bildung Von Molekulionen in Stationaren Edelgasentladungen, *Z. Naturforsch.*, **14A**, 239–246 (1959)
- 03423 Gupta, S. K., Jones, E. G., Harrison, A. G., Myher, J. J., Reactions of Thermal Energy Ions. VI. Hydrogen-Transfer Ion-Molecule Reactions Involving Polar Molecules, *Can. J. Chem.*, **45**, 3107–3117 (1967)
- 03424 Turner, B. R., Rutherford, J. A., Charge Transfer and Ion-Atom Interchange Reactions of Water Vapor Ions, *J. Geophys. Res.*, **73**, 6751–6758 (1968)
- 03425 Giese, C. F., The Reaction $\text{O}^+ + \text{N}_2 \Rightarrow \text{NO}^+ + \text{N}$, (In) Ion-Molecule Reactions in the Gas Phase, *Advances in Chemistry Series* 58, American Chemical Society Publications 1966, Pages 20–27
- 03426 Paulson, J. F., Some Negative Ion Reactions in Simple Gases, (In) Ion-Molecule Reactions in the Gas Phase, *Advances in Chemistry Series* 58, American Chemical Society Publications, 1966, Pages 28–43
- 03617 Martin, J. D., Bailey, T. L., Reactions of Low-Energy O^- Ions with D_2 and H_2 , *J. Chem. Phys.*, **49**, 1977–1978 (1968)
- 03618 Patterson, P. L., Evidence of the Existence of an He_3^+ Ion, *J. Chem. Phys.*, **48**, 3625–3631 (1968)
- 03619 Yamane, M., Hydrogen Ions in the Positive Column of a Hydrogen Glow Discharge, *J. Chem. Phys.*, **49**, 4624–4632 (1968)
- 03620 Dillard, J. G., Franklin, J. L., Seitz, W. A., Reactions of Negative Ions in the Gas Phase. III. The Formation of OCN^- , *J. Chem. Phys.*, **48**, 3828–3829 (1968)
- 03621 Stockdale, J. A., Compton, R. N., Reinhardt, P. W., Measurement of the Cross Section for the Reactions $\text{H}^- + \text{H}_2\text{O} \Rightarrow \text{OH}^- + \text{H}_2$ and $\text{D}^- + \text{D}_2\text{O} \Rightarrow \text{OD}^- + \text{D}_2$ at Incident Ion Energies Near 2 eV, *Phys. Rev. Letters*, **21**, 664–667 (1968)
- 03622 Martin, J. D., Experimental Investigations of Negative Ion Collisions – Electron Detachment and Ion Molecule Reactions, Thesis, University of Florida, 1967, 78 Pages, University Microfilms, Inc, Ann Arbor, Michigan, No. 68–13019

- 03623 Peuckert-Kraus, K., Untersuchungen Über Die Energieabhängigkeit Von Stossprozessen Negativer Ionen Mit Ladungsumverteilung, Ann. Physik, 7, 288–298 (1966)
- 03624 Warneck, P., Formation of N_4^+ in Nitrogen, J. Geophys. Res., 74, 396–397 (1969)
- 03625 Farragher, A. L., Peden, J. A., Fite, W. L., Charge Transfer of N_2^+ , O_2^+ , and NO^+ to Sodium Atoms at Thermal Energies, J. Chem. Phys., 50, 287–293 (1969)
- 03626 Moseley, J. T., Snuggs, R. M., Martin, D. W., McDaniel, E. W., Mobilities, Diffusion Coefficients, and Reaction Rates of Mass-Identified Nitrogen Ions in Nitrogen, Phys. Rev., 178, 240–248 (1969)
- 03627 Cronin, J. C., Sexton, M. C., Ion Conversion in an Argon Afterglow, Brit. J. Appl. Phys. (J. Phys. D 2), 1, 889–893 (1968)
- 03628 Moruzzi, J. L., Dakin, J. T., Negative-Ion-Molecule Reactions in N_2O , J. Chem. Phys., 49, 5000–5006 (1968)
- 03629 Smith, D., Copsey, M. J., Investigation of the Helium Afterglow. I. Mass Spectrometric Observations, J. Phys. B (Proc. Phys. Soc. 2), 1, 650–659 (1968)
- 03630 Smith, D., Crome, P. R., Conversion Rates and Ion Mobilities in Pure Neon and Argon Afterglow Plasmas, J. Phys. B (Proc. Phys. Soc. 2), 1, 638–649 (1968)
- 03631 Smith, D., Goodall, C. V., Copsey, M. J., Investigation of the Helium Afterglow. II. Langmuir Probe Observations, J. Phys. B (Proc. Phys. Soc. 2), 1, 660–668 (1968)
- 03632 Moran, T. F., Roberts, J. R., Collision-Induced Dissociation of Low Kinetic-Energy Ions, J. Chem. Phys., 49, 3411–3421 (1968)
- 03633 Jones, C. R., Robertson, W. W., Temperature Dependence of the Cross Section for the Destruction of the Helium Metastable Atom $\text{He}(2^3\text{S})$ by Argon, J. Chem. Phys., 49, 4240–4243 (1968)
- 03634 Lao, R. C. C., Rozett, R. W., Koski, W. S., Ion-Molecule Reactions of C^+ with N_2 and O_2 , J. Chem. Phys., 49, 4202–4209 (1968)
- 03635 Chupka, W. A., Russell, M. E., Photoionization Study of Ion-Molecule Reactions in Mixtures of Hydrogen and Rare Gases, J. Chem. Phys., 49, 5426–5437 (1968)
- 03636 Harrison, A. G., Concurrent Ion-Molecule Reactions in Ethylene and Propylene, Can. J. Chem., 41, 236–242 (1963)
- 03637 Fuchs, R., Ionen-Molekulreaktionen in Paraffinen, Olefinen und Azetylen, Z. Naturforsch, 16A, 1026–1037 (1961)
- 03852 Schlumbohm, H., Optische Anregung Beim Ladungsaustausch von Ne^+ -Ionen mit den Molekülen N_2 , O_2 und CO_2 bei Energien unterhalb 250 eV, Z. Naturforsch, 23A, 1386–1391 (1968)

- 03853 Ong, P. P., Hasted, J. B., Drift Measurements of Ion-Molecule Reactions, *J. Phys. B* (Atom. Mol. Phys. 2), 2, 91–101 (1969)
- 03854 Roche, A. E., Goodyear, C. C., Electron Detachment from Negative Oxygen Ions at Beam Energies in the Range 3 to 100 eV, *J. Phys. B* (Atom. Mol. Phys. 2), 2, 191–200 (1969)
- 03855 Palyukh, B. M., Savchin, L. S., Resonance Charge Transfer for Slow Potassium Ions, *Soviet Phys. Tech. Phys. English Transl.*, 13, 883–885 (1969)
- 03856 Palyukh, B. M., Savchin, L. S., Resonance Charge Transfer of Slow Cesium Ions, *Soviet Phys. Tech. Phys. English Transl.*, 13, 878–882 (1969)
- 03857 Lifshitz, C., Reuben, B. G., Ion-Molecule Reactions in Aromatic Systems. I. Secondary Ions and Reaction Rates in Benzene, *J. Chem. Phys.*, 50, 951–960 (1969)
- 03858 Durden, D. A., Kebarle, P., Good, A., Thermal Ion-Molecule Reaction Rate Constants at Pressures Up to 10 Torr with a Pulsed Mass Spectrometer. Reactions in Methane, Krypton, and Oxygen, *J. Chem. Phys.*, 50, 805–813 (1969)
- 03859 Gaur, J. P., Chanin, L. M., Rate Coefficient for $X^+ + 2X \Rightarrow X_2^+ + X$ in Neon and Argon, *Phys. Rev.*, 182, 167–175 (1969)
- 03860 Chen, C. J., Temperature Dependence of Dissociative Recombination and Molecular-Ion Formation in He, Ne, and Ar Plasmas, *Phys. Rev.*, 177, 245–254 (1969)
- 03861 Fluegge, R. A., Ion-Molecule Reactions in Alpha-Particle Irradiated Methane and Water Vapor, *J. Chem. Phys.*, 50, 4373–4380 (1969)
- 03862 Buttrill, S. E., Measurement of Ion-Molecule Reaction Rate Constants Using Ion Cyclotron Resonance, *J. Chem. Phys.*, 50, 4125–4132 (1969)
- 03863 Bowers, M. T., Elleman, D. D., King, J., Kinetic Analysis of the Ion-Molecule Reactions in Nitrogen-Hydrogen Mixtures Using Ion Cyclotron Resonance, *J. Chem. Phys.*, 50, 1840–1845 (1969)
- 03864 Bowers, M. T., Elleman, D. D., King, J., Analysis of the Ion-Molecule Reactions in Gaseous H_2 , D_2 , and HD by Ion Cyclotron Resonance Techniques, *J. Chem. Phys.*, 50, 4787–4804 (1969)
- 03865 Bohme, D. K., Dunkin, D. B., Fehsenfeld, F. C., Ferguson, E. E., Flowing Afterglow Studies of Ion-Molecule Association Reactions, *J. Chem. Phys.*, 51, 863–872 (1969)
- 03866 Belyaev, V. A., Brezhnev, B. G., Erastov, E. M., Resonant Charge Transfer of Low-Energy Carbon and Nitrogen Ions, *Soviet Phys. JETP English Transl.*, 27, 924–926 (1968)
- 03867 Vogt, D., Über Die Energieabhängigkeit Und Den Mechanismus Von Reaktionen Bei Stossen Langsamer Negativer Ionen Auf Moleküle, *Intern. J. Mass Spectry. Ion Phys.*, 3, 81–90 (1969)
- 03868 Romling, H., Untersuchung der Ionenumladung bei Gasentladungen in N_2-O_2 -Gemischen, *Z. Naturforsch.*, 24A, 393–398 (1969)

- 03869 Ryan, K. R., Ionic Collision Processes in Gaseous Nitrogen, *J. Chem. Phys.*, **51**, 570–576 (1969)
- 03967 Fehsenfeld, F. C., Ferguson, E. E., Mosesman, M. M., Measurement of the Thermal Energy Reaction $\text{NO}_2^+ + \text{NO} \Rightarrow \text{NO}^+ + \text{NO}_2$, *Chem. Phys. Letters*, **4**, 73–74 (1969)
- 04100 Trujillo, S. M., Neynaber, R. H., Rothe, E. W., Merging Beams, a Different Approach to Collision Cross Section Measurements, *Rev. Sci. Instr.*, **37**, 1655–1661 (1966)
- 04101 Ryan, K. R., Ionic Collision Processes in Gaseous Mixtures of Oxygen and Nitrogen, *J. Chem. Phys.*, **51**, 4136–4142 (1969)
- 04102 Bowers, M. T., Elleman, D. D., Kinetic Analysis of the Concurrent Ion–Molecule Reactions in Mixtures of Argon and Nitrogen with H_2 , D_2 , and HD UTILIZING Ion-Ejection Ion–Cyclotron–Resonance Techniques, *J. Chem. Phys.*, **51**, 4606–4617 (1969)
- 04103 Fehsenfeld, F. C., Ferguson, E. E., Bohme, D. K., Additional Flowing Afterglow Measurements of Negative Ion Reactions of D–Region Interest, *Planetary Space Sci.*, **17**, 1759–1762 (1969)
- 04104 Schlumbohm, H., Dissoziativer Ladungsaustausch von He^+ –und Ne^+ –Ionen mit den Molekülen N_2 , O_2 und CO_2 bei Stossenergien von 3 bis 200 eV, *Z. Naturforsch.*, **24A**, 1720–1724 (1969)
- 04105 Ferguson, E. E., Bohme, D. K., Fehsenfeld, F. C., Dunkin, D. B., Temperature Dependence of Slow Ion–Atom Interchange Reactions, *J. Chem. Phys.*, **50**, 5039–5040 (1969)
- 04106 Lee, Y., Photoionization of Alkali Metal Vapors, Thesis, University of California, Berkeley, 1965, 78 Pages, University Microfilms Inc., Ann Arbor, Michigan, No. 65–13526
- 04107 Peers, A. M., Ion–Molecule Reactions in Propene, *J. Phys. Chem.*, **73**, 4141–4144 (1969)
- 04245 Ding, A., Chemische Reaktionskinetik. XII. StoBmechanismus von D–Übertragungsreaktionen zwischen D_2 und CO_2^+ , D_2O^+ und H_2S^+ , *Z. Naturforsch.*, **21A**, 856–857 (1969)
- 04246 Ferguson, E. E., Negative Ion–Molecule Reactions, *Can. J. Chem.*, **47**, 1815–1820 (1969)
- 04247 Bohme, D. K., Aeronomic Importance of Ion–Molecule Clustering Reactions, *Can. J. Chem.*, **47**, 1809–1804 (1969)
- 04248 Burt, J. A., Dunn, J. L., McEwan, M. J., Sutton, M. M., Roche, A. E., Schiff, H. I., Some Ion–Molecule Reactions of H_3^+ and the Proton Affinity of H_2 , *J. Chem. Phys.*, **52**, 6062–6075 (1970)

- 04249 Adams, N. G., Bohme, D. K., Dunkin, D. B., Fehsenfeld, F. C., Ferguson, E. E., Flowing Afterglow Studies of Formation and Reactions of Cluster Ions of O_2^+ , O_2^- , and O^- , J. Chem. Phys., 52, 3133–3140 (1970)
- 04250 Fehsenfeld, F. C., Dunkin, D. B., Ferguson, E. E., Rate Constants for the Reaction of CO_2^+ with O, O_2 and NO; N_2^+ with O and NO; and O_2^+ with NO, Planetary Space Sci., 18, 1267–1269 (1970)
- 04251 Puckett, L. J., Teague, M. W., Production of $H_3O^+ \cdot nH_2O$ from NO^+ Precursor in $NO-H_2O$ Gas Mixtures, Ballistic Res. Lab., 1516, 1–47 (1970)
- 04252 Good, A., Durden, D. A., Kebarle, P., Ion–Molecule Reactions in Pure Nitrogen and Nitrogen Containing Traces of Water at Total Pressures 0.5–4 torr. Kinetics of Clustering Reactions Forming $H^+(H_2O)_n$, J. Chem. Phys., 52, 212–221 (1970)
- 04253 Good, A., Durden, D. A., Kebarle, P., Mechanism and Rate Constants of Ion–Molecule Reactions Leading to Formation of $H^+(H_2O)_n$ in Moist Oxygen and Air, J. Chem. Phys., 52, 222–229 (1970)
- 04254 Stockdale, J. A., Compton, R. N., Reinhardt, P. W., Reactions of O^- With Some Hydrocarbons in the Energy Region Between Zero and Two Electron Volts, Intern J. Mass Spectrometry Ion Phys., 4, 401–414 (1970)
- 04255 Kaneko, Y., Kobayashi, N., Kanomata, I., Low Energy Ion–Neutral Reactions. I. $^{22}Ne^+ + ^{20}Ne$, and $Ar^+ + N_2$, J. Phys. Soc. Japan, 27, 992–998 (1969)
- 04256 Schilderout, S. M., Franklin, J. L., High–Pressure Mass Spectra and Ion Chemistry of Carbon Dioxide, J. Chem. Phys., 51, 4055–4060 (1969)
- 04257 Wynn, M. J., Martin, J. D., Electron Detachment in Collisions of O^- , OH^- , and O_2^- Ions with Rare–Gas Atoms, J. Chem. Phys., 52, 191–197 (1970)
- 04258 Bailey, T. L., Mahadevan, P., Electron Transfer and Detachment in Collisions of Low–Energy Negative Ions with O_2 , J. Chem. Phys., 52, 179–190 (1970)
- 04259 McKnight, L. G., Drift Velocities and Interactions of Negative Ions in Oxygen, Phys. Rev. A, 2, 762–770 (1970)
- 04260 Veatch, G. E., Oskam, H. J., Recombination and Ion–Conversion Processes of Argon Ions, Phys. Rev. A, 1, 1498–1504 (1970)
- 04261 Lineberger, W. C., Puckett, L. J., Positive Ions in Nitric Oxide Afterglows, Phys. Rev., 186, 116–127 (1969)
- 04262 Lineberger, W. C., Puckett, L. J., Hydrated Positive Ions in Nitric–Oxide Water Afterglows, Phys. Rev., 1, 286–291 (1969)
- 04263 Fehsenfeld, F. C., Ferguson, E. E., Thermal Energy Reactions of C^- with O_2 , N_2O , CO, and CO_2 , J. Chem. Phys., 53, 2614–2615 (1970)

- 04264 Wilson, P. S., Rozett, R. W., Koski, W. S., Reaction of C⁺ with CH₄ in the 2–200-eV Energy Range, *J. Chem. Phys.*, **52**, 5321–5324 (1970)
- 04265 Fehsenfeld, F. C., Ferguson, E. E., Model for Associative–Detachment Reactions of the Insertion Type, *J. Chem. Phys.*, **51**, 3512–3514 (1969)
- 04266 Farragher, A. L., Ion–Molecule Reaction Rate Studies in a Flowing Afterglow System, *Trans. Faraday Soc.*, **66**, 1411–1422 (1970)
- 04267 Schildcrout, S. M., Collins, J. G., Franklin, J. L., Mass Spectrometric Study of Ion–Neutral Reactions in Radio–Frequency Discharges in Carbon Dioxide, *J. Chem. Phys.*, **52**, 5767–5774 (1970)
- 04268 Johnsen, R., Brown, H. L., Biondi, M. A., Ion–Molecule Reactions Involving N₂⁺, N⁺, O₂⁺, and O⁺ Ions from 300°K to ~1 eV, *J. Chem. Phys.*, **52**, 5080–5084 (1970)
- 04269 Fehsenfeld, F. C., Si⁺ and SiO⁺ Reactions of Atmospheric Importance, *Can. J. Chem.*, **47**, 1808–1809 (1969)
- 04270 Kanomata, I., Kaneko, Y., Kobayashi, N., Low Energy Ion–Neutral Reactions, (In) Abstracts of the 6th International Conference on the Physics of Electron Atom Collisions, Cambridge, Mass., 1969, P. 83–85
- 04271 Puckett, L. J., Lineberger, W. C., Negative–Ion Reactions in NO–H₂O Mixtures, *Phys. Rev. A*, **1**, 1635–1641 (1970)
- 04272 Stockdale, J. A., Compton, R. N., Reinhardt, P. W., Studies of Negative–Ion–Molecule Reactions in the Energy Region from 0 to 3 eV, *Phys. Rev.*, **184**, 81–93 (1969)
- 04273 Aberth, W. H., Peterson, J. R., Ion–Ion Mutual Neutralization Cross Sections Measured by a Superimposed Beam Technique, *Phys. Rev.*, **1**, 158–165 (1970)
- 04274 Moseley, J. T., Aberth, W. H., Peterson, J. R., H⁺ +H⁻ Mutual Neutralization Cross Section Obtained with Superimposed Beams, *Phys. Rev. Letters*, **24**, 435–439 (1970)
- 04275 MacNeil, K. A. G., Thynne, J. C. J., The Formation of Negative Ions by Electron Impact on Silicon Tetrafluoride and Carbon Tetrafluoride, *Intern. J. Mass Spectrometry Ion Phys.*, **3**, 455–464 (1970)
- 04276 Paulson, J. F., Negative–Ion–Neutral Reactions in N₂O, *J. Chem. Phys.*, **52**, 959–962 (1970)
- 04277 Paulson, J. F., Some Negative–Ion Reactions with CO₂, *J. Chem. Phys.*, **52**, 963–964 (1970)
- 04278 Chantry, P. J., Formation of N₂O[−] via Ion–Molecule Reactions in N₂O, *J. Chem. Phys.*, **51**, 3380–3384 (1969)
- 04279 Mandl, A., Evans, E. W., Kivel, B., Electron Detachment from F[−] Ion in a Shock–Heated Cesium Fluoride–Argon Mixture, *Chem. Phys. Letters*, **5**, 307–309 (1970)

- 04280 Marshall, A. G., Buttrill, S. E., Calculation of Ion-Molecule Reaction Rate Constants from Ion Cyclotron Resonance Spectra: Methyl Fluoride, *J. Chem. Phys.*, **52**, 2752–2759 (1970)
- 04281 Heimerl, J., Johnsen, R., Biondi, M. A., Ion-Molecule Reactions, $\text{He}^+ + \text{O}_2$ and $\text{He}^+ + \text{N}_2$, at Thermal Energies and Above, *J. Chem. Phys.*, **51**, 5041–5048 (1969)
- 04282 Vogt, D., Hauffe, B., Neuert, H., Ladungsaustausch-Reaktionen Einiger Negativer Ionen Mit O_2 und die Elektronenaffinität des O_2 , *Z. Physik*, **232**, 439–442 (1970)
- 04283 Bolden, R. C., Hemsworth, R. S., Shaw, M. J., Twiddy, N. D., Measurements of Thermal-Energy Ion-Neutral Reaction Rate Coefficients for Rare-Gas Ions, *J. Phys. B*, **3**, 45–60 (1970)
- 04284 Bolden, R. C., Hemsworth, R. S., Shaw, M. J., Twiddy, N. D., The Measurement of Penning Ionization Cross Sections for Helium 2^3S Metastables Using a Steady-State Flowing Afterglow Method, *J. Phys. B*, **3**, 61–71 (1970)
- 04285 Adams, N. G., Bohme, D. K., Ferguson, E. E., Reactions of He_2^+ , Ne_2^+ , Ar_2^+ , and Rare-Gas Hydride Ions with Hydrogen at 200°K, *J. Chem. Phys.*, **52**, 5101–5105 (1970)
- 04286 Weiner, J., Peatman, W. B., Berry, R. S., Electron Transfer from O^- to the 3p Level of Na^+ in 0- to 7-eV Collisions, *Phys. Rev. Letters*, **25**, 79–82 (1970)
- 04287 Compton, R. N., Bailey, T. L., Electron Detachment in Collisions of Low-Energy O^- Ions with N_2 , *J. Chem. Phys.*, **53**, 454–456 (1970)
- 04288 Wilson, P. S., Rozett, R. W., Koski, W. S., Reaction of $\text{C}^+(^2\text{P})$ with CH_3F , *J. Chem. Phys.*, **53**, 1276–1279 (1970)
- 04289 Bohme, D. K., Adams, N. G., Mosesman, M. M., Dunkin, D. B., Ferguson, E. E., Flowing Afterglow Studies of the Reactions of the Rare-Gas Molecular Ions He_2^+ , Ne_2^+ , and Ar_2^+ with Molecules and Rare-Gas Atoms, *J. Chem. Phys.*, **52**, 5094–5101 (1970)
- 04290 Dunkin, D. B., Fehsenfeld, F. C., Ferguson, E. E., Rate Constants for the Thermal Energy Reactions of H^- with O_2 , NO , CO , and N_2O , *J. Chem. Phys.*, **53**, 987–989 (1970)
- 04291 Varney, R. N., Monatomic and Diatomic Ions in Oxygen, *Phys. Rev. A*, **2**, 370–378 (1970)
- 04293 Bailey, T. L., May, C. J., Muschlitz, E. E., Scattering of Low-Energy H^- Ions in Helium, Neon, and Argon, *J. Chem. Phys.*, **26**, 1446–1451 (1957)
- 04294 Wilson, P. S., Rozett, R. W., Koski, W. S., Reactions of C^+ Ions with Some Methyl Halides, *J. Chem. Phys.*, **52**, 3494–3499 (1970)
- 04295 Ryan, K. R., Ionic Collision Processes in Water Vapor, *J. Chem. Phys.*, **52**, 6009–6016 (1970)
- 04389 Snuggs, R. M., Volz, D. J., Gatland, I. R., Schummers, J. H., Martin, D. W., McDaniel, E. W., Ion-Molecule Reactions between O^- and O_2 at Thermal Energies and Above, *Phys. Rev. A*, **3**, 487–493 (1971)

- 04390 Huntress, W. T., Mosesman, M. M., Elleman, D. D., Relative Rates and Their Dependence on Kinetic Energy for Ion-Molecule Reactions in Ammonia, *J. Chem. Phys.*, **54**, 843-849 (1971)
- 04409 Adams, N. G., Bohme, D. K., Dunkin, D. B., Fehsenfeld, F. C., Temperature Dependences of the Rate Coefficients for the Reactions of Ar^+ with O_2 , H_2 , and D_2 , *J. Chem. Phys.*, **52**, 1951-1955 (1970)
- 04410 Fehsenfeld, F. C., Albritton, D. L., Burt, J. A., Schiff, H. I., Associative-Detachment Reactions of O^- and O_2^- by $\text{O}_2(^1\Delta_g)$, *Can. J. Chem.*, **47**, 1793-1795 (1969)
- 04529 Puckett, L. J., Teague, M. W., Ion-Molecule Reactions in $\text{NO}-\text{NH}_3$ Gas Mixtures, *J. Chem. Phys.*, **54**, 4860-4863 (1971)
- 04530 Di Domenico, A., Sen Sharma, D. K., Franklin, J. L., Dillard, J. G., Collision Reactions of Negative Ions in Several Sulfur Compounds and in Their Mixtures with CICN, *J. Chem. Phys.*, **54**, 4460-4467 (1971)
- 04531 Brodskii, V. B., Voronchev, A. T., Kreneva, T. V., Fedorov, V. L., Measurement of the Cross Section for Ionization of a Cesium Atom by an Excited Mercury Atom, High Temp. USSR English Transl., **8**, 854-855 (1970)
- 04532 Dunkin, D. B., McFarland, M., Fehsenfeld, F. C., Ferguson, E. E., Rate Constants for the Reaction of O^+ with NO , N_2O , and NO_2 , *J. Geophys. Res.*, **76**, 3820-3821 (1971)
- 04533 Howard, C. J., Rundle, H. W., Kaufman, F., Gas-Phase Reaction Rates of Some Positive Ions with Water at 296°K , *J. Chem. Phys.*, **53**, 3745-3751 (1970)
- 04567 Eisner, P. N., Hirsh, M. N., Two-Body Recombination of NO^+ with NO_2^- and NO_3^- Measured in a Thermal Plasma at 300°K , *Phys. Rev. Letters*, **26**, 874-877 (1971)
- 04568 Dunkin, D. B., Fehsenfeld, F. C., Schmeltekopf, A. L., Ferguson, E. E., Three-Body Association Reactions of NO^+ with O_2 , N_2 , and CO_2 , *J. Chem. Phys.*, **54**, 3817-3822 (1971)
- 04569 Peterson, J. R., Aberth, W. H., Moseley, J. T., Sheridan, J. R., Ion-Ion Mutual Neutralization Cross Sections Measured by a Superimposed Beam Technique. II. $\text{O}_2^+ + \text{O}_2^-$, $\text{O}_2^+ + \text{NO}_2^-$, and $\text{NO}^+ + \text{NO}_2^-$, *Phys. Rev. A*, **3**, 1651-1657 (1971)
- 04570 Jones, E. G., Harrison, A. G., Asymmetric Charge Transfer Reactions of Rare Gas Ions at Low Ion Energies, *Intern. J. Mass Spectrometry Ion Phys.*, **6**, 77-88 (1971)
- 04571 Bohme, D. K., Dunkin, D. B., Fehsenfeld, F. C., Ferguson, E. E., Observation of Saturation in Three-Body Ion-Neutral Association Reactions, *J. Chem. Phys.*, **49**, 5201-5202 (1968)
- 04572 Fehsenfeld, F. C., Ion Chemistry of SF_6 , *J. Chem. Phys.*, **54**, 438-439 (1970)
- 04573 Fehsenfeld, F. C., Ferguson, E. E., Fast Reactions $\text{NO}^+(\text{H}_2\text{O})_n + \text{NH}_3 \Rightarrow \text{NH}_4^+ (\text{H}_2\text{O})_{n-1} + \text{HNO}_2$, $n = 1-3$, and $\text{NO}^+\text{NH}_3 + \text{NH}_3 \Rightarrow \text{NH}_4^+ + \text{ONNH}_2$, *J. Chem. Phys.*, **54**, 439-440 (1970)

- 04574 Ryan, K. R., Ionic Collision Processes in Gaseous Ammonia, *J. Chem. Phys.*, **53**, 3844–3848 (1970)
- 04575 Payzant, J. D., Kebarle, P., Clustering Equilibrium $\text{N}_2^+ + 2\text{N}_2 = \text{N}_4^+ + \text{N}_2$ and the Bond Dissociation Energy of N_4^+ , *J. Chem. Phys.*, **53**, 4723–4724 (1970)
- 04576 Goode, G. C., O'Malley, R. M., Ferrer-Correia, A. J., Massey, R. I., Jennings, K. R., Futrell, J. H., Llewellyn, P. M., Rate Constants for Ion-Molecule Reactions Determined by ICR Mass Spectrometry, *Intern. J. Mass Spectrometry Ion Phys.*, **5**, 393–406 (1970)
- 04577 Jones, E. G., Harrison, A. G., Resonant Charge Transfer Reactions in Neon, Argon, and Krypton, *Intern. J. Mass Spectrometry Ion Phys.*, **5**, 178–181 (1970)
- 04578 Shaw, M. J., Bolden, R. C., Hemsworth, R. S., Twiddy, N. D., Measurements of the Cross Section for Penning Ionization of H by He 2^3S Metastables, *Chem. Phys. Letters*, **8**, 148–152 (1971)
- 04579 Pfau, S., Rutscher, A., Wirkungsquerschnitte fur die Penning-Ionisation von H_2 , N_2 , Ar, Kr, Xe und Hg durch Metastabile Neonatome, *Annalen Phys.*, **25**, 321–333 (1970)
- 04580 Young, C. E., Edelson, D., Falconer, W. E., Water Cluster Ions: Rates of Formation and Decomposition of Hydrates of the Hydronium Ion, *J. Chem. Phys.*, **53**, 4295–4302 (1970)
- 04581 Kinsman, P. R., Rees, J. A., Ionization, Attachment and Ion-Molecule Reactions in Oxygen, *Intern. J. Mass Spectrometry Ion Phys.*, **5**, 71–81 (1970)
- 04582 Tiernan, T. O., Marcotte, R. E., Collision-Induced Dissociation of NO^+ and O_2^+ at Low Kinetic Energies: Effects of Internal Ionic Excitation, *J. Chem. Phys.*, **53**, 2107–2122 (1970)
- 04587 Koyano, I., Nakayama, N., Tanaka, I., Ion-Molecule Reactions by a Photoionization Mass Spectrometer. III. $\text{C}_3\text{H}_6 + n - \text{C}_4\text{D}_{10}$ and Cyclo $\text{C}_3\text{H}_6 + n - \text{C}_4\text{D}_{10}$ Mixtures, *J. Chem. Phys.*, **54**, 2384–2387 (1971)
- 04588 Puckett, L. J., Teague, M. W., Production of $\text{H}_3\text{O}^+ \cdot n\text{H}_2\text{O}$ from NO^+ Precursor in $\text{NO}-\text{H}_2\text{O}$ Gas Mixtures, *J. Chem. Phys.*, **54**, 2564–2572 (1971)
- 04589 Su, T., Kevan, L., Positive Ion-Molecule Reactions in Perfluoropropane, *J. Chem. Phys.*, **54**, 4871–4880 (1971)
- 04590 Sinda, T., Study of Ion Production by Penning Effect, *Phys. Letters A*, **33**, 225–226 (1970)
- 04591 Fehsenfeld, F. C., Mosesman, M. M., Ferguson, E. E., Ion-Molecule Reactions in an $\text{O}_2^+ - \text{H}_2\text{O}$ System, *J. Chem. Phys.*, **55**, 2115–2120 (1971)
- 04592 Fehsenfeld, F. C., Mosesman, M. M., Ferguson, E. E., Ion-Molecule Reaction in $\text{NO}^+ - \text{H}_2\text{O}$ System, *J. Chem. Phys.*, **55**, 2120–2125 (1971)

- 04593 Truby, F. K., Ion Decay Studies in Photo-Ionized Bromine, Phys. Rev. A, 4, 114-121 (1971)
- 04594 Pharo, M. W., Scott, L. R., Mayr, H. G., Brace, L. H., Taylor, H. A., An Experimental Study of the Ion Chemistry and Thermal Balance in the E- and F-Regions Above Wallops Island, Planetary Space Sci., 19, 15-25 (1971)
- 04595 Maier, W. B., Murad, E., Study of Collisions between Low-Energy N⁺ and N₂: Reaction Cross Sections, Isotopic Compositions and Kinetic Energies of the Products, J. Chem. Phys., 55, 2307-2316 (1971)
- 04596 Johnsen, R., Brown, H. L., Biondi, M. A., Reactions of Na⁺, K⁺, and Ba⁺ Ions with O₂, NO, and H₂O Molecules, J. Chem. Phys., 55, 186-188 (1971)
- 04597 Maier, W. B., Reactions Between N₂⁺ and N₂, J. Chem. Phys., 55, 2699-2707 (1971)
- 04598 McKnight, L. G., Sawina, J. M., Drift Velocities and Interactions of Negative Ions in Oxygen. II. O₄⁻, Phys. Rev. A, 4, 1043-1046 (1971)
- 04599 Lifshitz, C., Hughes, B. M., Tiernan, T. O., Electron Affinities from Endothermic Negative-Ion Charge-Transfer Reactions, NO₂ and SF₆, Chem. Phys. Letters (Netherlands), 7, 469-472 (1970)
- 04600 Murad, E., Maier, W. B., Production of N₂⁺ in Collisions Between N⁺ and N₂, Chem. Phys. Letters (Netherlands), 7, 624-626 (1970)
- 04601 Moutinho, A. M. C., Baede, A. P. M., Los, J., Charge Transfer between Alkali and Oxygen Molecules, Physica, 51, 432-444 (1971)
- 04602 Veatch, G. E., Oskam, H. J., Recombination and Ion-Conversion Processes in Helium-Neon Mixtures, Phys. Rev. A, 2, 1422-1428 (1970)
- 04603 Huntress, W. T., Elleman, D. D., An Ion Cyclotron Resonance Study of the Ion-Molecule Reactions in Methane-Ammonia Mixtures, J. Amer. Chem. Soc., 92, 3565-3573 (1970)
- 04636 Keller, G. E., Beyer, R. A., CO₂ Clustering to K⁺, BRL Report No. 1528, 59 Pages, (1971), Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland
- 04645 Phelps, A. V., Pack, J. L., Experimental Measurements on Atomic Collision Processes Related to Atmospheric Physics, Report No. AFCRL-70-0342, Final Report, Period Covered: 15 May 1970, Westinghouse Research Laboratories, Pittsburgh, PA (1970)
- 04650 Parkes, D. A., Electron Attachment and Negative Ion-Molecule Reactions in Pure Oxygen, Trans. Faraday Soc., 67, 711-729 (1971)



Author Index

Aberth, W. H.	02978	04273	04274	04569	Carlton, T. S.	03145	
Adams, N. G.	04249	04285	04289	04409	Cermak, V.	03086 03201	
Albritton, D. L.	04410				Chanin, L. M.	03859	
Aquilanti, V.	03089	03095	03097	03195	Chantry, P. J.	04278	
Baede, A. P. M.	04601				Chen, C. J.	03860	
Bailey, T. L.	03140	03617	04258	04287	04293	Chen, C. L.	00739
Baker, C. E.	02979				Chupka, W. A.	03028 03029 03635	
Barker, R.	03327				Clarke, E. M.	03142	
Batey, P. H.	03143				Colgate, S. O.	03146	
Beaty, E. C.	02980	02981	03210		Collins, J. G.	04267	
Becker, P. M.	02982	03150			Compton, R. N.	03621 04254 04272 04287	
Belyaev, V. A.	03369	03866			Cook, C. J.	02978	
Benton, E. E.	03356				Copsey, M. J.	03148 03629 03631	
Berry, R. S.	04286				Court, G. R.	03143	
Berta, M. A.	03335				Cramer, W. H.	03149 03326	
Beyer, R. A.	04636				Cress, M. C.	03150	
Biondi, M. A.	02395	03361	04268	04281	04596	Cromey, P. R.	03630
Bloomfield, C. H.	02984				Cronin, J. C.	03627	
Boelrijk, N.	03333				Dahler, J. S.	03030	
Bohme, D. K.	02985	03865	04103	04105	04247	Dakin, J. T.	03628
	04249	04285	04289	04409	04571		
Bolden, R. C.	04283	04284	04578			Dale, F.	03118 03329
Bowers, M. T.	03863	03864	04102			Derwish, G. A. W.	03031 03032 03359 03366
Brace, L. H.	04594					Di Domenico, A.	04530
Brezhnev, B. G.	03369	03866				Dillard, J. G.	03357 03620 04530
Brodskii, V. B.	04531					Ding, A.	04245
Brown, H. L.	04268	04596				Dorfman, L. M.	03225
Burch, D. S.	03144					Dunkin, D. B.	03407 03865 04105 04249 04250
Burt, J. A.	04248	04410				04289	04290 04409 04532 04568
Buttrill, S. E.	03862	04280				04571	
						Dunn, J. L.	04248

Durden, D. A.	03858	04252	04253		Frankevich, E. L.	03134
Edelson, D.	04580				Franklin, J. L.	03030 03096 03109 03110 03152
Edmonds, P. H.	03033					03199 03200 03224 03357 03421
Eisner, P. N.	04567					03620 04256 04267 04530
Ekin, J. W.	03352				Friedman, L.	03072 03075 03099 03106 03153
Elleman, D. D.	03863	03864	04102	04390	Fuchs, R.	03196 03197 03330 03408
Entemann, E. A.	03406				Futrell, J. H.	03637
Erastov, E. M.	03369	03866			Galli, A.	03091 03092 03126 03127 04576
Evans, E. W.	04279				Gatland, I. R.	03031 03032 03097 03359 03366
Falconer, W. E.	04580				Gaur, J. P.	04389
Farragher, A. L.	03625	04266			Geballe, R.	03859
Fedorov, V. L.	04531				Gerber, R. A.	03144
Fehsenfeld, F. C.	03034	03036	03037	03038	Giardini-Guidoni, A.	02189
	03040	03041	03042	03043		03031 03032 03074 03075 03097
	03046	03080	03121	03122		03359 03366
	03354	03405	03407	03865	Giese, C. F.	03967
	04103	04105	04249	04250		03076 03077 03425
	04265	04269	04290	04409	Gilman, G. I.	04410
	04532	04568	04571	04572		03122
	04591	04592			Goldan, P. D.	04573
Ferguson, E. E.	03034	03036	03037	03038		03036 03037 03046 03080
	03040	03041	03042	03043	Good, A.	03044
	03046	03080	03121	03122		03858 04252 04253
	03354	03356	03405	03407	Goodall, C. V.	03151
	03967	04103	04105	04246		03631
	04250	04263	04265	04285	Goode, G. C.	04249
	04290	04532	04568	04571		04576
	04591	04592			Goodyear, C. C.	04573
Ferrer-Correia, A.	04576					03854
Field, F. H.	03030	03096	03109	03110	Greaves, C.	03152
	03189	03199	03200	03219		03423
	03421				Gupta, S. K.	
Fineman, M. A.	03138				Gutbier, H.	03082
Fisk, B. A.	03047				Hackam, R.	03336 03351
Fite, W. L.	03048	03049	03625		Hamill, W. H.	03104 03198 03327 03332 03333
Fluegge, R. A.	03861					03334
Foner, S. N.	03367				Hand, C. W.	03084 03226
Fouracre, R. A.	03128				Harrison, A. G.	03083 03124 03125 03221 03360
						03363 03364 03423 03636 04570
					Hasted, J. B.	04577
						02984 02985 03033 03112 03853

Hauffe, B.	04282		Kinsman, P. R.	04581			
Haynes, R. M.	03328		Kivel, B.	04279			
Head, H. N.	03224		Knoll, B.	03420			
Heimerl, J.	04281		Kobayashi, N.	04255 04270			
Hemsworth, R. S.	04283	04284	04578	Koski, W. S.	03079 03324 03325 03335 03634 04264 04288 04294		
Henglein, A.	03085	03420		Koyano, I.	03093 03094 04587		
Herman, Z.	03086	03201		Kreneva, T. V.	04531		
Hertel, G. R.	03324	03325		Kubose, D. A.	03198		
Hertzberg, M.	03116			Kushnir, R. M.	03365		
Hess, G. G.	03088			Lacmann, K.	03420		
Hirsh, M. N.	04567			Lampe, F. W.	02982 03088 03096 03150 03152 03189 03200 03421		
Homer, J. B.	03218			Lao, R. C. C.	03634		
Hotop, H.	03090			Larin, I. K.	03135		
Howard, C. J.	04533			Lee, Y.	03098 04106		
Hudson, R. L.	03367			Lehrle, R. S.	03218		
Hughes, B. M.	04599			Lennon, J. J.	03351		
Huntress, W. T.	04390	04603		Leventhal, J. J.	03099 03196 03408		
Ivko, A.	03221			Lifshitz, C.	03857 04599		
Jennings, K. R.	04576			Lineberger, W. C.	04261 04262 04271		
Jesse, N.	03223			Llewellyn, P. M.	04576		
Johnsen, R.	04268	04281	04596	Lorentz, D. C.	02978		
Jones, C. R.	03633			Lorquet, A. J.	03334		
Jones, E. G.	03423	04570	04577	Los, J.	04601		
Kaneko, Y.	04255	04270		MacNeil, K. A. G.	04275		
Kanomata, I.	04255	04270		Magnuson, G. D.	03362		
Kaufman, F.	04533			Mahadevan, P.	03362 04258		
Kebarle, P.	03328	03858	04252	04253	04575	Mahan, B. H.	03047 03098 03145
Keller, G. E.	04636			Maier, W. B.	03076 03077 03100 03101 03102 03192 03355 04595 04597 04600		
Kevan, L.	04589			Mandl, A.	04279		
King, J.	03863	03864					

Marcotte, R. E.	04582		Murad, E.	04595	04600
Markin, M. I.	03135		Muschlitz, E. E.	02979	03191 04293
Marshall, A. G.	04280		Myher, J. J.	03083	03423
Martin, D. W.	03105	03626 04389	Nakayama, N.	04587	
Martin, J. D.	03617	03622 04257	Nakshbandi, M. M.	03112	
Martin, T. W.	03103		Neuert, H.	03331	04282
Massey, R. I.	04576				
Matsen, F. A.	03356		Neynaber, R. H.	03113	03114 04100
May, C. J.	04293		Niehaus, A.	03090	
Mayr, H. G.	04594		Niles, F. E.	03115	03137
McAfee, K. B.	03409		Noble, P. C.	03225	
McDaniel, E. W.	03105	03626 04389	O'Malley, R. M.	04576	
McEwan, M. J.	04248		Ogg, R. A.	03116	
McFarland, M.	04532		Omura, I.	03093	
McGuire, J. M.	02979		Ong, P. P.	02985	03853
McKnight, L. G.	03409	04259 04598	Ortenburger, I.B.	03116	
Megill, L. R.	02985		Oskam, H. J.	02189	03117 04260 04602
Melton, C. E.	03103	03104 03190	Pack, J. L.	03154	04645
Meyer, F.	03124		Pahl, M.	03422	
Miller, C. D.	03092		Palyukh, B. M.	03365	03855 03856
Miller, T. M.	03105		Parkes, D. A.	04650	
Mittelstadt, V.R.	03117		Parks, E. K.	03047	
Moran, T. F.	03099	03106 03153 03197 03632	Patterson, P. L.	02980	02981 03210 03618
Moruzzi, J. L.	03220	03352 03628	Paulson, J. F.	03118	03329 03426 04276 04277
Moseley, J. T.	03105	03626 04274 04569	Payzant, J. D.	04575	
Mosesman, M. M.	03967	04289 04390 04591 04592	Peatman, W. B.	04286	
Mosher, R. L.	03118	03329	Peden, J. A.	03625	
Moutinho, A.M.C.	04601		Peers, A. M.	04107	
Muccini, G. A.	03085		Peterson, J. R.	02978	04273 04274 04569
Munson, M. S. B.	03030	03109 03110	Peuckert-Kraus, K.	03623	
			Pfau, S.	04579	

Pharo, M. W.	04594		Schiff, H. I.	03037	03044	03046	03080	04248			
Phelps, A. V.	03154	03220	03352	04645	04410						
Potter, R. F.	03222		Schildcrout, S.M.	04256	04267						
Pottie, R. F.	03334		Schissler, D. O.	03120	03132	03133					
Pritchard, H.	03363		Schlumbohm, H.	03852	04104						
Puckett, L. J.	04251	04261	04262	04271	04529	Schmeltekopf, A.L.	03034	03036	03037	03038	03039
		04588				03040	03041	03042	03043	03044	
Rees, J. A.	04581					03046	03080	03121	03122	03354	
Refaey, K.	03029		Schmidt, T. W.	03146							
Reinhardt, P. W.	03621	04254	04272			Schummers, J. H.	04389				
Reuben, B. G.	03072	03857				Scott, L. R.	04594				
Robb, J. C.	03218					Searles, S. K.	03328				
Roberts, J. R.	03632					Seitz, W. A.	03620				
Robertson, W. W.	03115	03137	03356	03633		Sen Sharma, D. K.	04530				
Roche, A. E.	03854	04248				Sena, L. A.	03365				
Rol, P. K.	03406					Sexton, M. C.	03627				
Romling, H.	03868					Shahin, M. M.	03123				
Roth, W.	03078					Shannon, T. W.	03124	03125	03221	03364	
Rothe, E. W.	03114	04100				Shaw, M. J.	04283	04284	04578		
Rozett, R. W.	03079	03634	04264	04288	04294	Sheridan, J. R.	04569				
Rundle, H. W.	04533					Sholette, W. P.	03191				
Russell, M. E.	03028	03029	03635			Sieck, L. W.	03126	03127			
Rutherford, J. A.	03048	03049	03087	03129	03130	Sinda, T.	04590				
	03131	03139	03424			Sipler, D. P.	03409				
Rutscher, A.	04579					Smith, A. C. H.	03049				
Ryan, K. R.	03091	03092	03869	04101	04295	Smith, D.	03119	03128	03148	03629	03630
	04574						03631				
Saporoschenko, M.	03107	03108	03368			Snow, W. R.	03048				
Sauter, G. F.	02189					Snuggs, R. M.	03626	04389			
Savchin, L. S.	03855	03856				Stebbins, R. F.	03049	03129	03130	03131	03138
Sawina, J. M.	04598						03139				
Sayers, J.	03119	03143	03148			Stevenson, D. P.	03120	03132	03133		

Stockdale, J. A.	03621	04254	04272	Vance, D. W.	03140	
Su, T.	04589			Varney, R. N.	03403 04291	
Sutton, M. M.	04248			Veatch, G. E.	04260 04602	
Talrose, V. L.	03134	03135		Vogt, D.	03331 03867 04282	
Tan, K. L.	03136			Volpi, G. G.	03031 03032 03074 03089 03095	
Tanaka, I.	03093	04587			03097 03195 03359 03366	
Taylor, H. A.	04594			Volz, D. J.	04389	
Teague, M. W.	04251	04529	04588	Von Engel, A.	03136	
Teter, M. P.	03137			Von Koch, H.	03330	
Theard, L. P.	03332			Von Weyssenhoff, H.	03084 03226	
Thomas, D. W.	03218			Voronchev, A. T.	04531	
Thynne, J. C. J.	03360	04275		Warneck, P.	03141 03193 03194 03358 03624	
Tiernan, T. O.	04582	04599		Weiner, E. R.	03324	
Truby, F. K.	04593			Weiner, J.	04286	
Trujillo, S. M.	03113	03114	04100	Weingartshofer, A.	03142	
Turner, B. R.	03087	03129	03131	Wexler, S.	03223	
			03138	03139	Williams, R. R.	03327
Twiddy, N. D.	04283	04284	04578	Wilson, P. S.	04264 04288 04294	
Utterback, N. G.	03353			Wynn, M. J.	04257	
Van Lint, V.A.J.	03048			Yamane, M.	03619	
Van Zyl, B.	03353			Young, C. E.	04580	

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET		1. PUBLICATION OR REPORT NO. NBS SP381	2. Gov't Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE Bibliography of Ion-Molecule Reaction Rate Data January 1950 - October 1971		5. Publication Date October 1973		
7. AUTHOR(S) George Sinnott		6. Performing Organization Code		
9. PERFORMING ORGANIZATION NAME AND ADDRESS NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234		10. Project/Task/Work Unit No.		
12. Sponsoring Organization Name and Address Same as No. 9.		11. Contract/Grant No.		
15. SUPPLEMENTARY NOTES		13. Type of Report & Period Covered Final		
16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.) A bibliography is presented of papers in the open literature that contain original experimental data on ion-molecule reaction rates or cross sections. Positive and negative ion-molecule and ion-ion reactions are included but not electron impact processes. For papers to be included, the reactants must have been identified and data for kinetic energies below 10 electron volts must have been presented.				
17. KEY WORDS (Alphabetical order, separated by semicolons) Atoms; bibliography; cross-sections; ions; molecules; rate coefficients; reactions.				
18. AVAILABILITY STATEMENT <input checked="" type="checkbox"/> UNLIMITED. <input type="checkbox"/> FOR OFFICIAL DISTRIBUTION. DO NOT RELEASE TO NTIS.		19. SECURITY CLASS (THIS REPORT) UNCL ASSIFIED	21. NO. OF PAGES 73	
		20. SECURITY CLASS (THIS PAGE) UNCL ASSIFIED	22. Price \$1.00	

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

—
OFFICIAL BUSINESS

Penalty for Private Use, \$300

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE
COM-215

