ENERGY DISPOSAL IN ION-MOLECULE REACTIONS: EXPERIMENT AND THEORY (U) CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY M T BOWERS 20 AUG 86 AFOSR-TR-86-8936

UNCLASSIFIED AFOSR-82-0035
MICROCOPY RESOLUTION TEST CHART
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Energy Disposal in Ion-Molecule Reactions:
Experiment and Theory

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**Title:** Energy Disposal in Ion Molecule Reactions

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**Abstract:**

Work was completed in three areas:

A. Kinetic Energy of Products of Simple Ion-Molecule Reactions;

B. Internal Energy Dependence of Simple Bimolecular Ion-Molecule Reactions;

C. Photodissociation Dynamics of Simple Ion-Neutral Clusters.
I. ABSTRACT
During the tenure of this grant work was accomplished in the 3 areas; listed in the OBJECTIVES Section below. Summaries of this work have been given in the various Interim Reports and details are given in the attached complete set of reprints. In all 26 papers have been published and partial work completed on several additional projects. The work has been discussed at a large number of scientific meetings in both contributed and invited papers.

II. OBJECTIVES
A. Determination of Energy Disposal in Simple Unimolecular and Bimolecular Reactions.
B. Determination of the Effects of Internal Energy on the Rates and Branching Ratios of Bimolecular Reactions.
C. Determination of the Dynamics and energy Disposal in the Photodissociation of Simple Cluster Ions.

III. PROGRESS
Summaries of the work done are given in the various Interim Reports on file as well as the proposal submitted in Spring, 1985 (and subsequently funded as Grant AFOSR-86-0059). Consequently, a redundant summary of the work will not be given here. In the final few months of the grant work continued on a number of projects and preliminary results were obtained. Systems studied included photodissociation of the clusters (SO₃)₂⁻ and KrSO₄⁻. The work has subsequently been completed and papers have been written and accepted for publication.

Kinetic energy measurements on the products of reactions of C₁₂'H with O₃ and NO were also initiated during the last months of AFOSR-82-0035. This work is essentially complete now and papers will be written shortly.

IV. PAPERS PUBLISHED OR IN PRESS
CUMULATIVE LIST
1981/82

1982/83


1983/84


15. Effect of Reactant Ion Internal and Translational Energy on the Rate Constants of Charge Exchange Reactions: $\text{CO}_2^+ + \text{O} \rightarrow \text{O}_2^+ + \text{CO}_2$ and $\text{O}_2^+ + \text{O} \rightarrow \text{O}_3^+ + \text{O}_2$, R. Dera, P.R. Kempe and M.T. Bowers, J. Chem. Phys., 82, 4517 (1985).


1984/85


1984/85*


24. Reactions of Internally Excited, Energy Selected Ions, M.T.


*Not included in the list are the four papers mentioned in the Progress Section as these have not yet appeared in press.

V. PERSONNEL ASSOCIATED WITH THE PROJECT

Senior Research Personnel

Dr. Martin Jarrold  
Dr. Andreas Illies  
Dr. Tony O'Keefe  
Dr. Paul Kemper

Dr. Winifred Wagner-Redeker  
Dr. Lubomir Misev  
Dr. Renee Derai  
Dr. Chau-Hong Kuo

Junior Research Personnel

Ms. Denise Parent  
Mr. John Pearson  
Ms. Marina Rincon  
Ms. Hyun-Sook Kim

VI. PAPERS PRESENTED AT MEETINGS:

The various meetings at which both contributed and invited papers have been given on AFOSR sponsored research have been listed in previous interim reports. Here we list only a cumulative summary:

A. Contributed papers given - 25  
B. Invited Symposium Lectures - 12  
C. University Seminars - 15
END
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