

AD-A190 243

ELECTRON PRODUCTION ELECTRON ATTACHMENT AND CHARGE  
RECOMBINATION PROCESS I. (U) SAN DIEGO STATE UNIV CA  
DEPT OF ELECTRICAL AND COMPUTER ENGIN.. L C LEE NOV 87  
AFOSR-TR-87-1733 AFOSR-87-0059 F/G 20/3

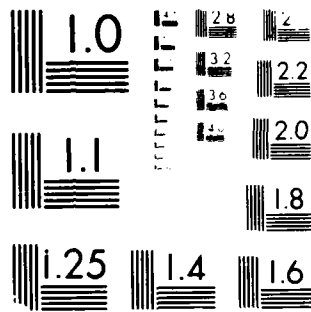
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MICROCOPY RESOLUTION TEST CHART  
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**AD-A190 243 DOCUMENTATION PAGE**

Form Approved  
 OMB No. 0704-0188

Unclassified			1b. RESTRICTIVE MARKINGS			
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT <b>Approved for public release.        distribution unlimited</b>			
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE						
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)  <b>AFOSR-TR-87-1735</b>			
6a. NAME OF PERFORMING ORGANIZATION Sandiego State University		6b. OFFICE SYMBOL (if applicable)	7a. NAME OF MONITORING ORGANIZATION AFOSR/NP			
6c. ADDRESS (City, State, and ZIP Code) Dept of Electrical & Computer Engineering College of Engineering Sandiego CA 92182-0190			7b. ADDRESS (City, State, and ZIP Code) Bldg 410 Bolling AFB, D.C. 20332-6448			
8a. NAME OF FUNDING/SPONSORING ORGANIZATION AFOSR		8b. OFFICE SYMBOL (if applicable) NP	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR-87-0059			
8c. ADDRESS (City, State, and ZIP Code) same as 7b.			10. SOURCE OF FUNDING NUMBERS			
			PROGRAM ELEMENT NO. 61102F	PROJECT NO. 2301	TASK NO. A7	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) "ELECTRON PRODUCTION, ELECTRON ATTACHMENT AND CHARGE RECOMBINATION PROCESS IN HIGH PRESSURE GAS DISCHARGES"						
12. PERSONAL AUTHOR(S) Professor Long C. Lee						
13a. TYPE OF REPORT FINAL		13b. TIME COVERED FROM 86/10/01 TO 87/9/30		14. DATE OF REPORT (Year, Month, Day) JAN 06 1988		15. PAGE COUNT 5
16. SUPPLEMENTARY NOTATION						
17.1. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)			
FIELD	GROUP	SUB-GROUP	ELECTRON PRODUCTION, ELECTRON ATTACHMENT, CHARGE RECOMBINATION ←			
19. ABSTRACT (Continue on reverse if necessary and identify by block number)						
<p>A mass spectrometer system has been purchased by this grant. The purchased equipment were used to construct an apparatus as shown in Fig. 1. This apparatus includes a quadrupole mass analyzer, ion detectors, high vacuum pump system, a vacuum chamber, electronics and power supplies, as well as optical multichannel analyzer and excimer laser. This apparatus is being used to analyze the positive and negative ions produced in electrical discharges. The transient chemical species in electrical discharges (such as radicals and excited ions) are also being investigated using this apparatus. The information obtained from this research are useful for the understanding of discharge mechanisms.</p> <p><i>(Keywords: _____)</i></p>						
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input checked="" type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED			
22a. NAME OF RESPONSIBLE INDIVIDUAL LT COL BRUCE L. SMITH			22b. TELEPHONE (Include Area Code) (202)767-4907		22c. OFFICE SYMBOL NP	

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**AFOSR-TR- 87-1735..**

November 20, 1987

Final Report for Grant No. AFOSR-87-0059  
University Research Instrumentation Program  
Covering the period from October 1, 1986 to September 30, 1987

Instruments Acquired for Supporting the Research Entitled;

ELECTRON PRODUCTION, ELECTRON ATTACHMENT AND CHARGE  
RECOMBINATION PROCESS IN HIGH PRESSURE GAS DISCHARGES

Submitted by:

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Prepared for:

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AFOSR/NP

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This report covers the period from October 1, 1986 to September 30, 1987 for the Grant No. AFOSR-87-0059 supported by the University Research Instrumentation Program. A mass spectrometer system has been purchased by this Grant. The equipment is mainly used to support the research program currently sponsored by the Air Force Office of Scientific Research under Grant No. AFOSR-86-0205. This equipment will also enhance the research capability for the project currently supported by the SDIO/IST managed by ONR under Grant No. N00014-86-K-0558. The manufacturers and costs as well as the uses of the equipment are listed in the attached Schedule 1.

The purchased equipment were used to construct an apparatus as shown in Fig. 1. This apparatus includes a quadrupole mass analyzer, ion detectors, high vacuum pump system, a vacuum chamber, electronics and power supplies, as well as optical multichannel analyzer and excimer laser. This apparatus is being used to analyze the positive and negative ions produced in electrical discharges. The transient chemical species in electrical discharges (such as radicals and excited ions) are also being investigated using this apparatus. The information obtained from this research are useful for the understanding of discharge mechanisms.

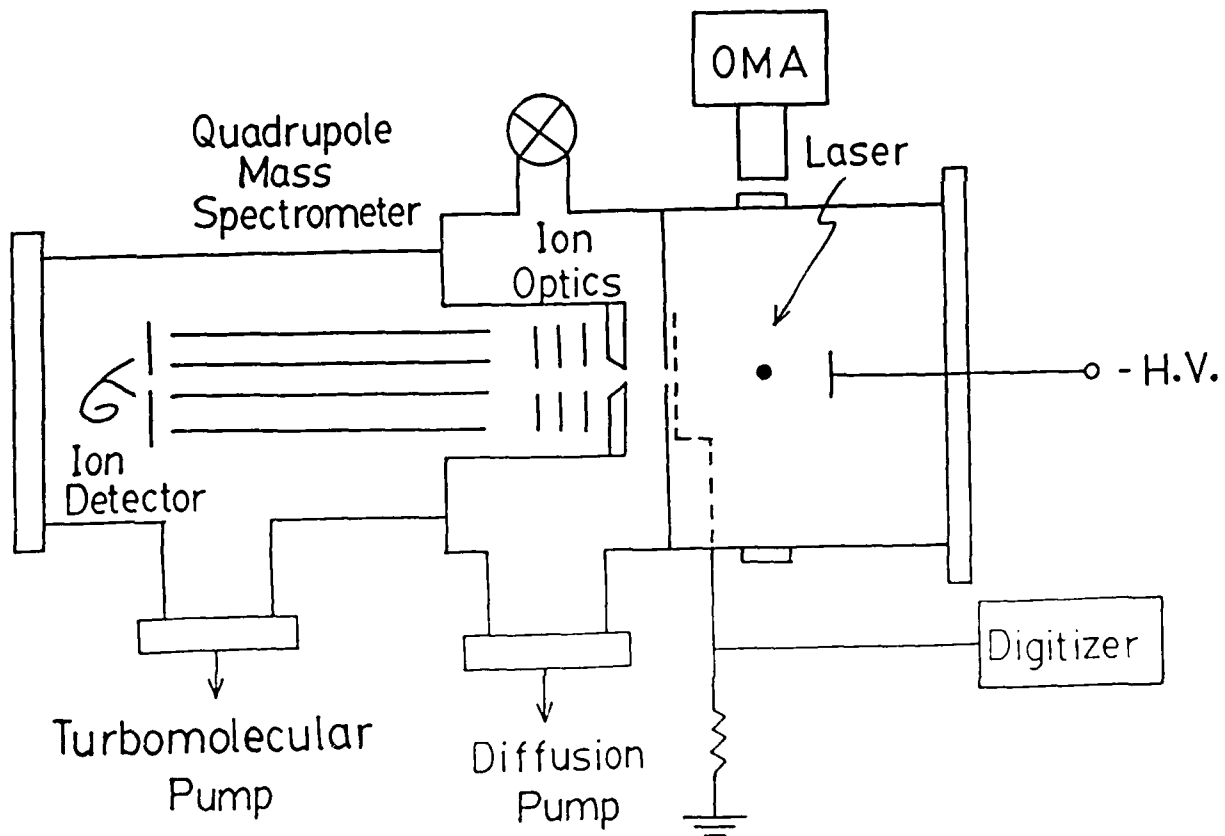


Fig. 1. Schematic diagram for the apparatus constructed for analyzing the chemical species in discharge media.

Schedule 1. List of Equipment Purchased

1. C50 Electronics System \$17,640  
Manufactured by Extrel Corporation, Pittsburg, PA.  
This electron system is used to control the mass spectrometer system.
2. 3/8" Quadruple mass spectrometer with electron multiplier \$11,300  
Manufactured by Extrel Coporation, Pittsburg, PA.  
This mass spectrometer is used to analyze and to detect ions from electrical discharges.
3. Vacuum Chamber \$ 2,506  
Manufactured by Huntington Laboratories, Inc. (Mountain View, CA)  
This vacuum chamber is used to house the mass spectrometer and the electrical discharge electrodes.
4. Differential UHV Pumping System \$30,253  
Manufactured by Varian Associates, Burlington, MA.  
A turbomolecular pump and a diffusion pump are included in this pumping system. This system is used to pump the discharge chamber and the mass spectrometer housing chamber.
5. Power Supply and Ion Gun with Vacuum Flange \$ 9,275  
Manufactured by Varian Associates, Mountain View, CA.  
This equipment is used to substain and to modify electrical discharges.
6. OMA III System \$20,313  
Manufactured by EG & G Princeton Applied Research (Princeton, NJ) with a cost of \$20,313 paid by this grant. The total cost for the entire system was \$51,150.  
This system is used to monitor the transient excited species produced from electrical discharges.

7. Excimer Laser with Vacuum Pump \$ 8,278

Manufactured by Lumonics, Inc. (Ontario, Canada) with a cost of \$8,278 paid by this grant. The total cost for this equipment is \$30,200.

This equipment is used to photoexcited molecules, radicals and ions in electrical discharges.

8. Laboratory Table \$ 3,894

Manufactured by Newport Corporation, Newport CA.

This table is used to install Vacuum Chamber and Pump System.

9. Valves, Flanges, Focussing Lens, Electronics \$ 4,541

Manufactured by Melles Griot (\$933), Varian Associates Products (\$2,110), and Tektronics (\$1,498)

These equipment are parts of the apparatus.



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