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HARVARD UNIVERSITY

Department of Chemistry
12 Oxford Street
Cambridge, Massachusetts 02138

February 28, 1966

Dear Contributor:

This is the ninth*microwave spectroscopy information letter and is being sent to those who contributed.

1. ALLAHABAD UNIVERSITY
Physics Department
Prof. Krishnaji

| | | | |
|--------------------------|-------------------|----------|---|
| CH_2Br_2 | Methylene bromide | A. Singh | Spectrum recorded and final assignment in progress. |
|--------------------------|-------------------|----------|---|

2. UNIVERSITY COLLEGE OF NORTH WALES, BANGOR
Department of Chemistry
J. Sheridan

| | | | |
|---|-------------------------|------------------|---|
| $\text{C}_3\text{H}_3\text{NO}$ | Isoxazole | W. C. Mackrodt | 146 lines assigned. Note in preparation. |
| C_2HF_3 | Trifluoroethylene | O. L. Stiefvater | In manuscript. |
| $\text{C}_3\text{D}_2\text{HF}$ (CD_2FCCH) | 3-Fluoropropyne- $3d_2$ | P. A. Curnuck | Assigned to complete the structure determination. |

3. UNIVERSITY OF BOLOGNA
Chemical Institute "G. Ciamician"
P. G. Favero

| | | | |
|---|--------------------------|-----------------------|--|
| AsF_3 | Arsenic trifluoride | A. Mirri | Millimeter wave spectrum; centrifugal effects and force constants. |
| $\text{C}_2\text{H}_6\text{O}$ ($(\text{CH}_3)_2\text{O}$) | Dimethyl ether | A. Mirri P. Favero | Millimeter wave spectrum for potential barrier determination. |
| ClNO_2 (NO_2Cl) | Nitryl chloride | A. Mirri | Millimeter wave spectrum, centrifugal effects and force constants. |
| FNO_2 (NO_2F) | Nitryl fluoride | A. Mirri | Millimeter wave spectrum, centrifugal effects and force constants. |
| FNO (NOF) | Nitrosyl fluoride | A. Guarnieri | Nitrogen quadrupole coupling constants. |
| CClFO (COFCl) | Chloro-carbonyl fluoride | A. Guarnieri | Stark effect and dipole moment. |

*The eighth letter was erroneously labelled letter number seven.

4. UNIVERSITY OF BRISTOL
Department of Physical Chemistry
A. Peter Cox

| | | | |
|----------------|--------------|---------------|--|
| HNO_2 | Nitrous acid | Alan Brittain | Trans nitrous acid; manuscript in preparation. |
|----------------|--------------|---------------|--|

5. UNIVERSITY OF COPENHAGEN
Department of Chemical Physics
Børge Bak

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|--|-------------------|--|---|
| $\text{C}_2\text{H}_2\text{N}_2\text{S}$ | 1,3,4-Thiadiazole | | ^{13}C - and ^{15}N -species assigned. Paper in press. |
| $\text{C}_3\text{H}_3\text{NS}$ | Thiazole | | ^{34}S -species assigned. |
| $\text{C}_5\text{H}_5\text{N}$ | Pyridine | | 4- ^{13}C -species assigned. |
| $\text{C}_6\text{H}_4\text{F}_2$ | m-Difluorobenzene | | Spectrum assigned. |
| $\text{C}_2\text{H}_2\text{N}_2\text{O}$ | 1,3,4-oxadiazole | | Spectrum assigned. |

6. EASTERN NAZARENE COLLEGE
Physics Department
John Rigden

| | | | |
|-------------------------|-------------------|-------------------------|----------------------------|
| CH_2FNO | Carbamyl fluoride | R. Jackson J. Rigden | Manuscript in preparation. |
|-------------------------|-------------------|-------------------------|----------------------------|

7. UNIVERSITY OF FREIBURG
Physikalisches Institut
H. D. Rudolph and H. Dreizler

| | | | |
|--|--------------------|----------------------------|--|
| $\text{C}_7\text{H}_7\text{F}$ (m- CH_3 - C_6H_4 -F) | m-Fluoro toluene | A. Trinkaus | Partially assigned. |
| C_5H_7 | N-methyl pyrrole | W. Arnold | Assignment completed, rot.-vib. interaction in progress. |
| $\text{C}_2\text{H}_4\text{O}_2$ (HCOOCH_3) | Methyl formate | H. Dreizler | Vibrational satellites |
| $\text{C}_2\text{H}_6\text{OS}$ ($(\text{CH}_3)_2\text{SO}$) | Dimethyl sulfoxide | W. D. Feder | ^{34}S , ^{13}C , - d_1 complete, - d_3 in progress. |
| C_7H_8 (CH_3 - C_6H_5) | Toluene | A. Jaeschke P. Wendline | Paper being prepared. |
| $\text{C}_4\text{H}_4\text{N}_2$ | Pyridazine | W. Werner | Paper prepared. |
| $\text{C}_2\text{H}_6\text{S}_2$ (CH_3SSCH_3) | Dimethyl disulfide | D. Sutter | Internal rotation paper in press. |

| | | | |
|----------------------------------|-------------------|--|-----------------------------|
| $C_5H_4O_2$ | Furfural | F. Mönnig | Excited vibrational states. |
| C_6H_7N | 4-Methyl pyridine | H. Seiler | Work completed. |
| C_4H_5N $((CH_3)_2CHCN)$ | iso-Butyl nitrile | G. Herberich | Assignment started. |
| C_7H_7F $(p-CH_3-C_6H_4-F)$ | p-Fluoro toluene | H. D. Rudolph | Paper in press. |
| C_4H_6O $((CH_3)_2C=C=O)$ | Dimethylketene | G. Dendl H. D. Rudolph H. Dreizler | Isotopic species. |

8. GEORGIA INSTITUTE OF TECHNOLOGY

School of Physics

T. L. Weatherly and Quitman Williams

| | | | |
|-------------------|------------------------|------------|---|
| $Cl_3P (PCl_3)$ | Phosphorus trichloride | C. R. Nave | Analysis of quadrupole interaction in progress. |
| $Cl_3OP (POCl_3)$ | Phosphoryl chloride | C. R. Nave | Analysis of quadrupole interaction in progress. |
| CCl_3F | Trichlorofluoromethane | A. Wolf | Analysis of quadrupole interaction almost complete. |
| $CHCl_3$ | Chloroform | A. Wolf | Analysis of quadrupole interaction almost complete. |

9. HARVARD UNIVERSITY

Department of Chemistry

E. Bright Wilson, Jr.

| | | | |
|-------------------------------|--------------------|----------------------------|--------------------------------------|
| FH_5Si_2 (SiH_3SiH_2F) | Fluorodisilane | A. P. Cox and R. Varma | Manuscript submitted for publication |
| CH_3GeN (GeH_3CN) | Germyl cyanide | R. Varma and K. Buckton | In manuscript. |
| GeH_6Si (GeH_3SiH_3) | Germyl silane | A. P. Cox and R. Varma | Structure complete. |
| C_2H_5FO (CH_2FCH_2OH) | 2-Fluoroethanol | K. Buckton | Manuscript in preparation. |
| C_3H_6O $(CH_3OC_2H_3)$ | Methyl vinyl ether | N. Owen | Manuscript in preparation. |
| C_2HF_3O (CF_3CHO) | Fluoral | R. C. Woods | Manuscript in preparation. |
| C_4H_8O $(CH_3CHCHCH_3)$ | t-2,3-Epoxybutane | M. Emptage | Manuscript in preparation. |

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| $C_2H_2F_2O$ (CFH_2CFO) | Fluoro-acetyl fluoride | E. Saegbarth | Manuscript in preparation. |
| $C_5H_{10}O$ ($(CH_3)_3CCHO$) | Pivalaldehyde | A. M. Ronn and R. C. Woods | Manuscript in preparation. |
| CH_4Se (CH_3SeH) | Methyl selenol | C. Thomas | Nearly finished |
| $C_3H_6O_2$ (C_2H_5COOH) | Propionic acid | O. L. Stiefvater | One rotamer analyzed. |
| $C_3H_6O_2$ (C_2H_5OCHO) | Ethyl formate | J. Riveros | One rotamer analyzed. |
| C_2H_5ClO (CH_2ClCH_2OH) | 2-Chloroethanol | R. Azrak | Possible partial assignment. |
| F_2O_3 | Ozone difluoride | J. Martins | Low temperature spectrometer and sample ready. |
| C_3H_5FO ($CH_3CH_2C(=O)F$) | Propionyl fluoride | O. L. Stiefvater | One rotamer assigned. |

10. UNIVERSITY OF ILLINOIS
Department of Chemistry
W. H. Flygare

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|----------------------------------|----------------------------------|--|--------------------|
| $C_3H_4F_2$ ($CH_3CH:CF_2$) | 1,1-Difluoropropene | | Spectrum assigned. |
| C_3H_4FCl ($CH_3CF:CClH$) | cis 2-fluoro-3-chloropropene-2 | | In progress. |
| C_3H_4FCl ($CH_3CF:CClH$) | trans 2-fluoro-3-chloropropene-2 | | In progress. |

11. JET PROPULSION LABS
Physics Section
R. L. Poynter and R. A. Beaudet

| | | | |
|-----------------------------------|--------------------------|------------------------------------|---------------------------|
| $C_2H_6B_4$ ($C_2B_4H_6$) | 1,2-dicarbahexaborane(6) | R. L. Poynter and R. A. Beaudet | All but C^{13} isotope. |
| $C_3H_6F_2$ ($CH_3CF_2CH_3$) | 2,2-difluoropropane | R. L. Poynter and R. A. Beaudet | Spectrum assigned. |

12. UNIVERSITY OF KANSAS
Chemistry Department
Marlin D. Harmony

| | | | |
|-------------------------------|--------------------------|--|-------------------------------|
| C_5H_7Cl | Spiropentyl chloride | | Manuscript in progress. |
| C_3H_7N ($C_3H_5NH_2$) | Cyclopropyl amine | | Assignment underway. |
| N_2O | Nitrous oxide | | Hyperfine structure analyzed. |
| CF_3NO | Trifluoronitroso methane | | In progress. |

13. UNIVERSITY KIEL
Lehrstuhl für Chemische Physik
Werner Zeil

| | | | |
|------------------------------------|--------------------------------|--|--|
| C_6H_9Cl ($(CH_3)_3CC=CCl$) | Tertiärbutyl- chloracetylen | Hans-Karl Bodenseh Richard Gegenheimer Jürgen Mennicke | 7 Isotopenmoleküle vermessen und Linien zugeordnet, r_S -Struktur bestimmt. |
| C_3H_9SiCl ($(CH_3)_3SiCl$) | Trimethylsilylchlorid | Hans-Karl Bodenseh Wilfried Muhr | Cl-Isotopenmoleküle u. Si-Iso- topenmoleküle vermessen und Linien zugeordnet Arbeit wird Fortgesetzt. |

14. UNIVERSITÉ DE LOUVAIN
Centre de Physique Nucléaire
M. de Hemptinne

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|------------------------------|----------------|---|---|
| C_2H_6O (C_2H_5OH) | Ethyl alcohol | Janine Michielsens- Effinger, J. P. Culot P. De Cat | Spectrum of normal and 6 iso- topic species in progress. |
| C_2H_3Cl (CH_2CHCl) | Vinyl chloride | G. A. Savariraj | Spectrum of C^{12} and C^{13} species assigned. |
| C_2H_3Br (CH_2CHBr) | Vinyl bromide | G. A. Savariraj | Spectrum of normal and deuterated species assigned. |
| SO_2 | Sulfur dioxide | R. Van Riet | Spectrum of isotopic species (S^{33} and O^{17}). |

15. UNIVERSITY OF MANCHESTER
Physical Laboratories
J. G. Baker

| | | | |
|-------------------------|------------------|------------|---|
| NO_2 | Nitrogen dioxide | R. M. Lees | Mm. wave spectrum of normal and isotopic forms assigned. |
| CH_4O (CH_3OH) | Methyl alcohol | R. M. Lees | Mm. wave spectrum in ground and excited torsion states partly assigned. |

16. UNIVERSITY OF MARYLAND
Institute for Molecular Physics
Lawrence C. Krisher

| | | | |
|---|-----------------|------------------------|--|
| AgCl | Silver chloride | Krisher and Norris | In press. |
| AgBr | Silver bromide | Krisher and Norris | In press. |
| C ₂ H ₃ OI (CH ₃ COI) | Acetyl iodide | McLoney and Krisher | Spectrum assigned, quadrupole barrier coupling in progress. |
| C ₂ H ₅ NO | Acetamide | Krisher | Not assigned. Low frequency motion of N in progress. |

17. MICHIGAN STATE UNIVERSITY
Department of Chemistry
R. H. Schwendeman

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|---|---------------------|-------------|----------------------------|
| C ₂ H ₅ BO ₂ (OCH ₂ CH ₂ OBH) | 1,3,2-dioxaborolane | J. H. Hand | Manuscript in preparation. |
| C ₂ H ₅ NO (CH ₃ CH=NOH) | Acetaldoxime | R. Rogowski | Nearly complete. |

18. MONASH UNIVERSITY
Chemistry Department
R. D. Brown

| | | | |
|----------------------------------|------------------------------|---------------|--|
| C ₄ H ₄ Se | Selenophene | P. D. Godfrey | Tentative assignment of one isotopic species. |
| C ₆ H ₆ | Dimethylene cyclo- butene | F. R. Burden | Assignment in progress. |
| SeOF ₂ | Selenium oxyfluoride | I. C. Bowater | Assignment in progress. |
| SeF ₄ | Selenium tetrafluoride | J. C. Bowater | Assignment in progress. |

19. NATIONAL BUREAU OF STANDARDS
Infrared & Microwave Spectroscopy Section
D. R. Lide

| | | | |
|--|------------------|----------------|----------------------------|
| FCN (excited states) | Fluorine cyanide | W. J. Lafferty | Measurements in progress. |
| C ₃ HN (HCCCN excited states) | Cyanoacetylene | W. J. Lafferty | Measurements in progress. |
| COS (OCS excited states) | carbonyl sulfide | A. G. Maki | Manuscript in preparation. |
| CHN (HCN excited states) | Hydrogen cyanide | A. G. Maki | Manuscript in preparation. |

| | | | |
|---|------------------------|---------------------------------|---------------------------------|
| HBF_2 | Difluoroborine | T. Kasuya and D. R. Lide | Almost complete. |
| $\text{BF}_3\text{H}_3\text{P}$ (PF_3BH_3) | | R. Kuczkowski D. R. Lide | Manuscript in preparation. |
| NP (PN) | | D. R. Lide | Abandoned |
| C_4H_8 | cis-2-Butene | T. Sarachman | Manuscript in preparation. |
| CsHO (CsOH) | Cesium hydroxide | R. Kuczkowski and D. R. Lide | Assigned. |
| CHNO (HNCO) (excited states) | Cyanic acid | W. J. Lafferty | Measurements in progress. |
| HNOS (HNSO) | Thionylimide | W. H. Kirchhoff | Manuscript in preparation. |
| $\text{C}_3\text{H}_4\text{N}_2$ | Pyrazole | W. H. Kirchhoff | Manuscript in preparation. |
| ClF_5 | Chlorine pentafluoride | W. H. Kirchhoff | Assigned. |
| ClF_4P (PClF_4) | | W. H. Kirchhoff | Spectrum measured. |
| FNS (NSF) | | W. H. Kirchhoff | Centrifugal distortion studied. |
| N_2O_3 | Dinitrogen trioxide | R. Kuczkowski | Isotopic species under study. |
| HNO_2 (HONO) | Nitrous acid | R. Kuczkowski | Isotopic species under study. |

20. NATIONAL RESEARCH COUNCIL, OTTAWA, CANADA
Division of Pure Physics
C. C. Costain

| | | | |
|---|----------------|-------------------------------|--|
| CN_4 (NCN_3) | Cyanogen azide | H. W. Kroto | Spectrum assigned. |
| $\text{C}_5\text{H}_{11}\text{N}$ ($\text{C}_5\text{H}_{10}\text{NH}$) | Piperidine | J. E. Parkin P. J. Buckley | Normal and ND species assigned D_{11} and D_{10}H in progress. |

21. UNIVERSITY OF OKLAHOMA
Department of Physics
Chun C. Lin

| | | | |
|---|------------------|-------------|----------------------|
| $\text{C}_2\text{H}_4\text{OS}$ (CH_3COSH) | Thio-acetic acid | S. Nakagawa | Some lines assigned. |
|---|------------------|-------------|----------------------|

22. THE PENNSYLVANIA STATE UNIVERSITY
Chemistry Department
L. Peter Gold

| | | | |
|---|--------------------|---|---|
| $\text{C}_3\text{H}_6\text{O}$ ($\text{CH}_3\text{OCH}=\text{CH}_2$) | Methyl vinyl ether | L. Peter Gold P. Cahil (Columbia) N. Owen (Harvard) | Final calculations in progress; paper in preparation |
|---|--------------------|---|---|

23. RICE UNIVERSITY
Chemistry Department
R. F. Curl

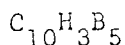
| | | | |
|--------------------------------|--------------------|-----------------|---|
| NO_2 | Nitrogen dioxide | Peter Foster | $N_0^{14} O_0^{17} O_0^{16}$ assigned, parameters determined. |
| F_2Si | Silicon difluoride | V. M. Rao | Centrifugal distortion, bending excited state. |
| $\text{C}_3\text{H}_6\text{O}$ | Allyl alcohol | A. N. Murty | Spectrum assigned. |
| CH_3N_3 | Methyl azide | W. M. Salathiel | Paper in press. |

24. SAHA INSTITUTE OF NUCLEAR PHYSICS
Microwave Spectroscopy Laboratory
D. K. Ghosh

| | | | |
|---|----------------|--|--|
| $\text{C}_2\text{H}_7\text{N}$ ($\text{C}_2\text{H}_5\text{NH}_2$) | Ethylamine | D. K. Ghosh and P. K. Bhattacharyya | The sample has been studied in the K-band. Some lines have been assigned from Stark effect studies. Complete assignments of the transitions are now being attempted. |
| CH_4O (CH_3OH) | Methyl alcohol | D. K. Ghosh, P. K. Bhattacharyya and A. Chatterjee | Work on the excited state model of the molecule is in progress. |

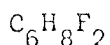
25. UNIVERSITY OF SOUTHERN CALIFORNIA
Department of Chemistry
R. A. Beaudet

| | | | |
|--|------------------------------------|---------------|-------------------------------|
| $\text{C}_3\text{H}_5\text{Br}$ (trans- $\text{CH}_3-\text{CH}=\text{CHBr}$) | trans-Bromo propylene | R. A. Beaudet | Spectrum assigned. |
| $\text{C}_3\text{H}_5\text{Br}$ (cis- $\text{CH}_3-\text{CH}=\text{CHBr}$) | cis-bromo propylene | R. A. Beaudet | Spectrum assigned. |
| $\text{C}_4\text{H}_6\text{F}_2$ ($\text{CH}_3-\text{CH}-\text{CF}_2$) $\quad \quad \quad \diagdown$ $\quad \quad \quad \text{CH}_2$ | 1,1-difluoro-2-methyl cyclopropane | R. Ford | Spectrum assigned. |
| $\text{C}_5\text{H}_6\text{F}_2$ ($\text{CF}_2=\text{C}-\text{CH}_3$ $\quad \quad \quad \diagdown$ $\quad \quad \quad \text{H} \quad \text{C}=\text{CH}_2$) | 1,1-difluoro-2-methyl butadiene | W. Cummings | In progress but not assigned. |
| $\text{C}_5\text{H}_6\text{F}_2$ ($\text{CF}_2=\text{C}-\text{H}$ $\quad \quad \quad \diagdown$ $\quad \quad \quad \text{C}=\text{CH}_2$ $\quad \quad \quad $ $\quad \quad \quad \text{CH}_3$) | 1,1-difluoro-3-methyl butadiene | Y. Huang | In progress but not assigned. |



S. Cheung

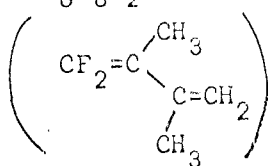
In progress.



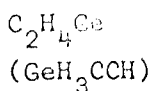
1,1-Difluoro-2,3-dimethyl butadiene

Y. Huang

In progress.



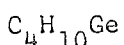
26. STANFORD UNIVERSITY
Department of Chemistry
V. W. Laurie



Germyl acetylene

E. C. Thomas

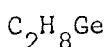
In press



Germacyclopentane

E. C. Thomas

Paper in preparation.



Dimethylgermane

E. C. Thomas

Assigned.



Methylenecyclobutane

L. H. Scharpen

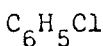
Paper in preparation.

27. UNIVERSITY OF STOCKHOLM
Institute of Physics
H. Selén



Iodobenzene

Spectrum assigned.



Chlorobenzene

Paper in progress.

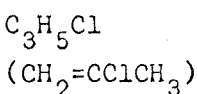
28. SWISS FEDERAL INSTITUTE OF TECHNOLOGY
Laboratory of Physical Chemistry
Hs. H. Günthard



Thionyl chloride

H. U. Wenger

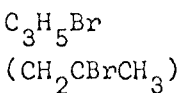
Spectrum measured



2-Chloropropene

W. Good

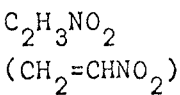
All deuterated species measured and assigned.



2-Bromopropene

H. P. Benz

In manuscript.



Nitroethylene

A. Bauder

Manuscript prepared.

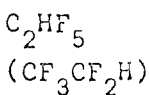
29. UNIVERSITY OF TEXAS
Department of Chemistry
James E. Boggs



Nitrosomethane

Dewitt Coffey

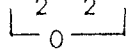
CD₃NO completed, partially deuterated species in progress.



Pentafluoroethane

Ann Tipton

Manuscript in preparation.

| | | | |
|---|----------------------|------------------------------|--|
| $C_3H_4O_3$ (CH_2CH_2OCO)  | Ethylene carbonate | Irene Wang | Study of vibrational excited states in progress. |
| 30. THE UNIVERSITY OF TOKYO Department of Chemistry Yonezo Morino | | | |
| COS (OCS) | Carbonyl sulfide | C. Matsumura | Vib.-rot. interaction and r_e structure, manuscript in preparation. |
| COSe (OCSe) | Carbonyl selenide | C. Matsumura | Vib.-rot. interaction and r_e structure, work almost completed. |
| NF ₃ | Nitrogen trifluoride | M. Otake and C. Matsumura | Vib.-rot. interaction and r_e structure, work almost completed. |
| F ₂ O | Oxygen difluoride | S. Saito | Vib.-rot. interaction and r_e structure, paper submitted to J. Mol. Spectry. |
| O ₂ S (SO ₂) | Sulfur dioxide | S. Saito | Higher excited vib. states, work almost completed. |
| CF ₂ O (F ₂ CO) | Carbonyl fluoride | S. Saito | Excited vib. states, paper submitted. |
| FNO ₂ | Nitryl fluoride | T. Tanaka | Vibrational assignment, manuscript in preparation. Coriolis interaction, work in progress. |
| CH ₃ Br, CD ₃ Br | Methyl bromide | C. Hirose | Excited vib. states, manuscript prepared. |
| CH ₃ I | Methyl iodide | C. Hirose | Excited vib. states, work almost complete. |
| C ₄ H ₈ | Butene-1 | S. Kondo and E. Hirota | Rotational isomerism in cis and gauche forms, manuscript in preparation. |
| | Deuterated butene-1 | S. Kondo | Work in progress. |
| C ₃ H ₅ Cl | Allyl chloride | E. Hirota | Rotational isomerism in cis and gauche forms, work in progress. |
| CH ₂ F ₂ | Methylene fluoride | E. Hirota | Excited vib. states, work in progress. |
| C ₃ H ₆ | Propylene | E. Hirota | Manuscript prepared. |
| | Deuterated propylene | E. Hirota and T. Hirooka | Excited vib. states, work in progress. |
| OS (SO) | Sulfur monoxide | T. Amano and E. Hirota | Excited vib. state and ³³ SO species assigned. |

31. THE UNIVERSITY OF TOKYO
Department of Physics
Koichi Shimoda

CH_2O_2 (HCOOH) Formic acid Y. Seki Lines of vibrationally excited state observed.

32. UNIVERSITY OF TOYAMA
Department of Physics
Takeshi Kojima

$\text{CH}_3\text{D}_2\text{N}$ Methyl amine Kojiro Takagi and Takeshi Kojima Spectrum assigned.
(CH_3ND_2)

CH_4DN Methyl amine Kojiro Takagi and Takeshi Kojima Spectrum assigned.
(CH_3NHD)

33. UNIVERSITY OF WISCONSIN
Department of Chemistry
C. D. Cornwell

$\text{CH}_3\text{F}_4\text{P}$ Monomethyl tetra- E. A. Cohen Work discontinued.
(CH_3PF_4) fluoro phosphorane

CF_7P Trifluoromethyl tetra- E. A. Cohen Satellite analysis in progress.
(CF_3PF_4) fluoro phosphorane

F_5IO (IOF₅) Iodine oxide penta- S. B. Pierce Experimental work completed.
fluoride

$\text{H}_5\text{B}_2\text{Br}$ Bromodiborane A. Ferguson Structural study in progress.
($\text{B}_2\text{H}_5\text{Br}$)

34. UNIVERSITY OF GLASGOW
Department of Chemistry
J. K. Tyler

CH_2N_2 Cyanamide J. K. Tyler Quadrupole coupling of two
(NH_2CN) ¹⁴N nuclei.

$\text{C}_6\text{H}_7\text{N}$ Aniline D. G. Lister Manuscript in press.
($\text{C}_6\text{H}_5\text{NH}_2$)

$\text{C}_6\text{H}_6\text{DN}$ Aniline J. K. Tyler Manuscript in press.
($\text{C}_6\text{H}_5\text{NHD}$)

35. UNIVERSITY OF CALIFORNIA
(Berkeley)
Department of Chemistry
W. D. Gwinn and R. J. Myers

See eighth letter with following changes.

Published: ethyleneimine, trimethylene sulfide, cyclobutene, trifluoronitromethane,
chlorocyclobutane, cyclobutyl fluoride.

Add:

$C_4H_6F_2$ difluorocyclobutane A. C. Luntz Partial assignment.

C_3H_7N trimethyleneimine B. Meyers Partial assignment.

FORMULA INDEX

(Arrangement as in Townes and Schawlow
Numbers refer to Institution)

| | |
|--|---|
| AgBr silver bromide - 16 | CH_3N_3 methyl azide - 23 |
| AgCl silver chloride - 16 | CH_4DN methyl amine - 32 |
| AsF_3 arsenic trifluoride - 3 | CH_4O methyl alcohol - 15 |
| $\text{BF}_3\text{H}_3\text{P}$ - 19 | CH_4O methyl alcohol - 24 |
| CClFO chloro-carbonyl fluoride - 3 | CH_4Se methyl selenol - 9 |
| CCl_3F trichlorofluoromethane - 8 | CN_4 cyanogen azide - 20 |
| CD_3Br methyl bromide - 30 | COS carbonyl sulfide - 19 |
| CF_2O carbonyl fluoride - 30 | COS carbonyl sulfide - 30 |
| CF_3NO trifluoronitroso methane - 12 | COSe carbonyl selenide - 30 |
| CF_3NO_2 trifluoronitromethane - 35 | C_2HF_3 trifluoroethylene - 2 |
| CF_7P trifluoromethyl tetrafluoro phosphorane - 33 | $\text{C}_2\text{HF}_3\text{O}$ fluoral - 9 |
| CHCl_3 chloroform - 8 | C_2HF_5 pentafluoroethane - 29 |
| CHN hydrogen cyanide - 19 | $\text{C}_2\text{H}_2\text{F}_2\text{O}$ fluoro-acetyl fluoride - 9 |
| CHNO cyanic acid - 19 | $\text{C}_2\text{H}_2\text{N}_2\text{O}$ 1,3,4-oxadiazole - 5 |
| CH_2Br_2 methylene bromide - 1 | $\text{C}_2\text{H}_2\text{N}_2\text{S}$ 1,3,4-thiadiazole - 5 |
| CH_2FNO carbamyl fluoride - 6 | $\text{C}_2\text{H}_3\text{Br}$ vinyl bromide - 14 |
| CH_2F_2 methylene fluoride - 30 | $\text{C}_3\text{H}_3\text{Cl}$ vinyl chloride - 14 |
| CH_2N_2 cyanimide-34 | $\text{C}_2\text{H}_3\text{NO}_2$ nitroethylene - 28 |
| CH_2O_2 formic acid - 31 | $\text{C}_2\text{H}_3\text{OI}$ acetyl iodide - 16 |
| CH_3Br methyl bromide - 30 | $\text{C}_2\text{H}_4\text{Ge}$ germyl acetylene - 26 |
| $\text{CH}_3\text{D}_2\text{N}$ methyl amine - 32 | $\text{C}_2\text{H}_4\text{OS}$ thio-acetic acid - 21 |
| $\text{CH}_3\text{F}_4\text{P}$ monomethyl tetrafluoro phosphorane - 33 | $\text{C}_2\text{H}_4\text{O}_2$ methyl formate - 7 |
| CH_3GeN germyl cyanide - 9 | $\text{C}_2\text{H}_5\text{BO}_2$ 1,3,2-dioxaboralane - 17 |
| CH_3I methyl iodide - 30 | $\text{C}_2\text{H}_5\text{ClO}$ 2-chloroethanol - 9 |
| CH_3NO nitrosomethane - 29 | $\text{C}_2\text{H}_5\text{FO}$ 2-fluoroethanol - 9 |
| | $\text{C}_2\text{H}_5\text{N}$ ethyleneimine - 35 |

| | |
|---|--|
| $C_2H_5NO_2$ acetamide - 16 | C_3H_6O allyl alcohol - 23 |
| C_2H_5NO acetaldoxime - 17 | $C_3H_6O_2$ ethyl formate - 9 |
| $C_2H_6B_4$ 1,2-dicarbahehexaborane(6) - 11 | $C_3H_6O_2$ propionic acid - 9 |
| C_2H_6O dimethyl ether - 3 | C_3H_6S trimethylene sulfide - 35 |
| C_2H_6O ethyl alcohol - 14 | C_3H_7N cyclopropyl amine - 12 |
| C_2H_6OS dimethyl sulfoxide - 7 | C_3H_7N trimethyleneimine - 35 |
| $C_2H_6S_2$ dimethyl disulfide - 7 | C_3H_9SiCl trimethylsilylchlorid - 13 |
| C_2H_7N ethylamine - 24 | $C_4H_4N_2$ pyridazine - 7 |
| C_2H_8Ge dimethylgermane - 26 | C_4H_4Se selenophene - 18 |
| C_3D_2HF 3-fluoropropyne-3d - 2 | C_4H_5N iso-butyl nitrile - 7 |
| C_3HN cyanacetylene - 19 | C_4H_6 cyclobutene - 35 |
| C_3H_3NO isoxazole - 2 | $C_4H_6F_2$ 1,1-difluoro-2-methyl cyclopropane - 25 |
| C_3H_3NS thiazole - 5 | $C_4H_6F_2$ difluorocyclobutane - 35 |
| C_3H_4FCl cis-2-fluoro-3-chloropropene-2 - 10 | C_4H_6O dimethylketene - 7 |
| C_3H_4FCl trans-2-fluoro-3-chloropropene-2 - 10 | C_4H_7Cl chlorocyclobutane - 35 |
| $C_3H_4F_2$ 1,1-difluoropropene - 10 | C_4H_7F cyclobutyl fluoride - 35 |
| $C_3H_4N_2$ pyrazole - 19 | C_4H_8 butene-1 - 30 |
| $C_3H_4O_3$ ethylene carbonate - 29 | C_4H_8 deuterated butene-1 - 30 |
| C_3H_5Br cis-bromo propylene - 25 | C_4H_8O t-2,3-epoxybutane - 9 |
| C_3H_5Br trans bromo propylene - 25 | $C_4H_{10}Ge$ germacyclopentane - 26 |
| C_3H_5Br 2-bromopropene - 28 | $C_5H_4O_2$ furfural - 7 |
| C_3H_5Cl 2-chloropropene - 28 | C_5H_5N pyridine - 5 |
| C_3H_5Cl allyl chloride - 30 | $C_5H_6F_2$ 1,1-difluoro-2-methyl butadiene - 2 |
| C_3H_5FO propionyl fluoride - 9 | $C_5H_6F_2$ 1,1-difluoro-3-methyl butadiene - 2 |
| C_3H_6 propylene - 30 | C_5H_7 N-methyl pyrrole - 7 |
| C_3H_6 deuterated propylene - 30 | C_5H_7Cl spiropentyl chloride - 12 |
| $C_3H_6F_2$ 2,2-difluoropropane - 11 | C_5H_8 methylenecyclobutane - 26 |
| C_3H_6O methyl vinyl ether - 9 | $C_5H_{10}O$ pivalaldehyde - 9 |
| C_3H_6O methyl vinyl ether - 22 | $C_5H_{11}N$ piperidine - 20 |

| | |
|---|---|
| $C_6H_4F_2$ m-difluorobenzene - 5 | F_5IO iodine oxide pentafluoride - 33 |
| C_6H_5Cl chlorobenzene - 27 | GeH_6Si germyl silane - 9 |
| C_6H_5I iodobenzene - 27 | HBf_2 difluoroborine - 19 |
| C_6H_6 dimethylene cyclobutene - 18 | $HNOS$ thionylimide - 19 |
| C_6H_6DN aniline - 34 | HNO_2 nitrous acid - 4 |
| C_6H_7N 4-methyl pyridine - 7 | HNO_2 nitrous acid - 19 |
| C_6H_7N aniline - 34 | H_5B_2Br bromodiborane - 33 |
| C_6H_9Cl tertiarbutylchloracetylen - 13 | NF_3 nitrogen trifluoride - 30 |
| C_7H_7F m-fluoro taluene - 7 | NO_2 nitrogen dioxide - 15 |
| C_7H_7F p-flu o toluene - 7 | NO_2 nitrogen dioxide - 23 |
| C_7H_8 toluene - 7 | NP - 19 |
| $C_{10}H_3B_5$ 1,1-difluoro-2,3-dimethyl butadiene - 25 | N_2O nitrous oxide - 12 |
| ClF_4P - 19 | N_2O_3 dinitrogen trioxide - 19 |
| ClF_5 chlorine pentafluoride - 19 | OS sulfur monoxide - 30 |
| $ClNO_2$ nitryl chloride - 3 | O_2S sulfur dioxide - 30 |
| Cl_3OP phosphoryl chloride - 8 | $SOCl$ thionyl chloride - 28 |
| Cl_3P phosphorous trichloride - 8 | SO_2 sulfur dioxyde - 14 |
| $CsHO$ cesium hydroxide - 19 | SeF_4 selenium tetrafluoride - 18 |
| FCN fluorine cyanide - 19 | $SeOF_2$ selenium oxyfluoride - 18 |
| FH_5Si_2 fluorodisilane - 9 | |
| FNO nitrosyl fluoride - 3 | |
| FNO_2 nitryl fluoride - 3 | |
| FNO_2 nitryl fluoride - 30 | |
| FNS - 19 | |
| F_2O oxygen difluoride - 30 | |
| F_2O_3 ozone difluoride - 9 | |
| F_2Si silicon difluoride - 23 | |