

HARVARD UNIVERSITY  
 Department of Chemistry  
 12 Oxford Street  
 Cambridge, Massachusetts 02138

March, 1971

Dear Contributor:

This is the fourteenth microwave spectroscopy information letter and is being sent to those who contributed:

1. UNIVERSITY OF ALLAHABAD  
 Department of Physics  
 Allahabad, India.  
 Prof. Krishnaji

$C_6H_4ClF$	meta-chlorofluorobenzene	S. L. Srivastava and K. K. Kirty	Spectrum assigned. Paper communicated.
$C_6H_4BrF$	ortho-bromofluorobenzene	S. L. Srivastava and K. K. Kirty	Assignment in progress.

2. Bashkirian Filial of Academy of Sciences of the USSR.

Institute of Chemistry

Ufa-450025, USSR.

N.M. Pozdeev.

$C_3H_4N^{14}N^{15}(1,2-N^{15}C_3H_4N^{14})$	pyrazole	assigned
$C_3D_2H_2N_2^{14}(3,4-D_2C_3H_2N_2^{14})$	pyrazole	assigned
$C_3D_3HN_2^{14}(3,4,5-D_3CHN_2^{14})$	pyrazole	assigned
$C_5H_6Se$	2-methylselenophen	assigned
$C_5H_6S$	3-methylthiophen	ground and first excited torsional states.

Name of Institution: UNIVERSITY OF BOLOGNA AND LABORATORIO DI  
SPETTROSCOPIA MOLECOLARE DEL C.N.R. -  
BOLOGNA - ITALY

Name to Whom Queries Should Be Addressed: P.G. FAVERO -  
ISTITUTO CHIMICO "G. CIAMICIAN" -  
VIA SELMI, 2 - BOLOGNA - ITALY

Formula	Name of Compound	Name of Investigator	Present Stage of Progress
$\text{COCl}_2$	Carbonyl chloride		in press
$\text{HClO}$	Hypochlorous acid		in press
$\text{C}_6\text{H}_5\text{I}$	Benzene Iodide		NQHFS analyzed in press
$(\text{CH}_3)_2\text{N-PF}_2$	Dimethylamino-difluoro- -phosphine	P.G.FAVERO P.FORTI	Normal species spectrum assigned d-6 spectrum in progress
$\text{C}_6\text{H}_{11}\text{Cl}$	Cyclohexyl chloride	D.DAMIANI L.FERRETTI	Spectrum assigned of axial species
$\text{C}_3\text{H}_4\text{O}$	Propargylalcohol	A.M.MIRRI G.CORBELLI	Millimetre spectrum in progress
$\text{C}_2\text{H}_3\text{NO}$	Glycolnitrile	D.LISTER	Higher K lines assigned, NQHFS analyzed
$\text{NH}_2\text{Cl}$	Monochloroamine	G.CAZZOLI D.LISTER	a-type transitions of different isotopic species assigned. Chlorine and nitrogen NQHFS analyzed.

4. UNIVERSITY OF BRISTOL  
 School of Chemistry  
 Bristol, BS8 1TS  
 England.  
 A. Peter Cox.

$\text{CH}_3\text{NO}$	Nitrosomethane	A. C. Morris	Isotopic work and centrifugal distortion in progress.
$\text{CH}_3\text{NO}_2$	Nitromethane	S. Waring	Quadrupole published, structure complete.
$\text{CH}_3\text{NO}_3$	Methyl nitrate	S. Waring	Structure complete, in manuscript.
$\text{HNO}_2$	Nitrous acid	(A. H. Brittain D. J. Finnigan)	Structure and properties ( <u>cis</u> and <u>trans</u> ) in press.
$\text{N}_2\text{O}_3$	Dinitrogen trioxide	(D. J. Finnigan A. C. Morris)	Quadrupole/Stark analysis complete.
$\text{C}_5\text{H}_5\text{IA}$	Cyclopentadienyl indium	(R. J. Adams C. Roberts)	Structure/quadrupole complete; excited state's analysis in progress.
$\text{C}_5\text{H}_5\text{Tl}$	Cyclopentadienyl thallium	C. Roberts	Structure complete, vibrations published.
$\text{C}_5\text{H}_5\text{NiNO}$	Cyclopentadienyl nitrosyl nickel	D. J. Finnigan	Analysis of higher excited states continuing.
$\text{C}_5\text{H}_5\text{PtNO}$	Cyclopentadienyl nitrosyl platinum	C. Roberts	Structure to be published with others.
$\text{C}_5\text{H}_5\text{TiC}_5\text{H}_7$	Cycloheptatrienyl titanium cyclopentadienide	(C. Roberts S. Moorhouse)	Structure to be published.

5. Bowdoin College  
 Department of Chemistry  
 S. S. Butcher

$\text{C}_2\text{H}_4\text{F}_2$       1,2-difluoroethane      Paper submitted

6. Name of Institution University of California  
Name of Department or Institute Department of Chemistry  
Name to Whom Queries Should Be Addressed David O. Harris

$\text{CHF}_2\text{COH}$	difluoroacetaldehyde	work started
$\text{CH}_3\text{COOOH}$	peroxyacetic acid	work started
$\text{C}-\text{O}-\text{C}-\text{C}=\text{O}$	oxetanone	manuscript
$\text{C}-\text{C}-\text{O}-\text{C}-\text{O}$	dioxolane	manuscript

7. Name of Institution University of Cincinnati  
Name of Department or Institute Department of Chemistry  
Name to Whom Queries Should Be Addressed Clarence H. Thomas

$\text{CH}_3\text{CHFCl}$	1-1 Chloro-fluoroethane	Clarence Thomas	Q-branch assigned
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8. UNIVERSITY OF COPENHAGEN  
 Chemical Physics Department  
 Copenhagen, Denmark  
 Børge Bak/Lise Nygaard

$C_2H_5N$	Ethyleneamine (aziridine)	Steen V. Skaarup	NH-, ND-, CD(syn)-, CD(anti)-, CD <sub>2</sub> -, <sup>13</sup> C-, and <sup>15</sup> N-species assigned.
$C_3H_4N_2$	Pyrazole	Dines Christen	3- <sup>13</sup> C-, 4- <sup>13</sup> C-, and 5- <sup>13</sup> C-species assigned.
$C_6H_5BrO$	4-bromophenol	N. Wessel Larsen	Assigned.
$C_6H_5ClO$	4-chlorophenol	N. Wessel Larsen	Barrier determined.
$C_6H_5FO$	4-fluorophenol	N. Wessel Larsen	Barrier determined.
$C_6H_5NO_2$	Nitrobenzene	Jens H. Høg	2-D-, 3-D-, 4-D-, 2- <sup>13</sup> C-, 3- <sup>13</sup> C-, <sup>15</sup> N-, and <sup>18</sup> O- species assigned. Further vibrational satellites of parent species assigned. Calc. of inertial defect.
$C_6H_6O$	Phenol	N. Wessel Larsen	3 of the 6 mono- <sup>13</sup> C- species assigned.
	Phenol-OD		Measurements in l. exc. tors. state extended.

9.

Name of Institution University of Freiburg  
 Name of Department or Institute Department of Physics  
 Name to Whom Queries Should Be Addressed H.D. Rudolph

$C_2H_3NS$ ( $CD_3SCN$ )	$d_3$ -methylthiocyanate	H. Heimburger	g.s. and 4 excited state spectra
$C_7H_8$ ( $CD_3C_6H_5$ ; $CH_3C_6H_4D$ )	toluene	W.A. Kreiner, B. Tan	4 deuterated species spectra, barrier, partial structure
$C_7H_8$ ( $CH_2DC_6H_5$ )	toluene	H. Schleser	work commenced
$C_7H_6F_2$ ( $CH_3C_6H_3F_2$ )	difluorotoluene	D. Schwach	assignment in progress
$C_8H_9F$ ( $(CH_3)_2C_6H_3F$ )	dimethylfluorobenzene	D. Schwach	several lines, no assignment
$C_8H_{10}$ ( $(CH_3)_2C_6H_4$ )	ortho-xylene	K. Walzer	7 deuterated species spectra, barrier, partial structure
$C_2H_6S$ ( $(CD_3)_2S$ )	$d_6$ -dimethylsulfide	B. Tan	$CD_3$ -excited torsional states potential barrier barrier coupling
$C_3H_7N$ ( $CH_2CHCH_2NH_2$ )	allylamine	I. Botskor, in collaboration with University of Nancy	N-cis rotamer spectrum in gauche rotamer progress
$C_5H_8$ ( $(CH_3)_2CCCH_2$ )	dimethylallene	J. Demaison	spectrum of excited torsional states
$C_8H_7N$ ( $CH_3C_6H_4CN$ )	p-cyanotoluene	M. Röhle	rotamer spectrum

Name of Institution Freie Universität Berlin  
 Name of Department or Institute II. Physikalisches Institut  
 Name to Whom Queries Should Be Addressed Prof. Dr. R. Honerjäger  
 1 Berlin 33 Boltzmannstraße 20

Diatomic IVa-VIa-Molecules		Honerjäger Tischer	Rotational Magnetic Moments
AL F	Aluminumfluoride	Hoeft Lovas Tiemann Törring	hyperfine constants electric dipole moments Z.Naturforsch. <u>25a</u> , 1029 (1970) Electric dipole moments Hyperfine constants J.Chem.Phys. <u>53</u> , 2736 (1970) rotational spectrum Hyperfine constants Z.Naturforsch. <u>25a</u> , 1750 (1970)
Ga F	Galliumfluoride		
F In (In F)	Indiumfluoride		
F Tl (Tl F)	Thalliumfluoride		
Diatomic (IVa/VIa) Molecules			
Ba O	Barium-oxide		
Ag Cl	Silver-chloride		Rotational spectrum Hyperfine constants
Ag Br	Silver-bromide		Z.Naturforsch. in press
Ag J	Silver-iodide		
In J	Indium-iodide	Schenk, Tiemann, Hoeft	Hyperfine structure Z.Naturforsch. in press
Cl Ga (Ga Cl)	Gallium-chloride	Hoeft, Grasshoff, Tiemann, Törring	Hyperfine structure
JK (KJ)	Potassium-iodide	El Ali, Hoeft, Tiemann, Törring	Hyperfine structure Hyperfine structure
Cs J	Cesium-iodide		
<sup>73</sup> Ge Te	Germanium-telluride	Hoeft, Tiemann, Törring	Hyperfine structure
Si S	Silicium-sulfide	Hoeft, Renwanz, Tiemann, Törring	Relations between isotopic species

11. UNIVERSITY OF GLASGOW.

DEPARTMENT OF CHEMISTRY - GLASGOW - SCOTLAND.

J. K. TYLER.

$C_3H_6N_2$ ( $(CH_3)_2NCN$ )	Dimethylcyanamide.	S. A. Mackay.	Work on excited torsional states continues.
$CF_2N_2$ ( $NF_2CN$ )	Difluorocyanamide.	S. A. Mackay.	Main species assigned. Dipole moment measured. $^{14}N$ fine structure analysis in progress.
$CD_2N_2$ ( $ND_2CN$ )	Dideuterocyanamide.	J. K. Tyler.	Further work on inversion type spectra.
$C_6H_5NCl$ ( $Cl-C_6H_4-NH_2$ )	p-chloroaniline	S. A. Mackay.	Measurements extended to $-NH_2$ and $-ND_2$ species.
$C_4H_3NO_2$	Maleimide.	J. K. Tyler	Work restarted.

Name of Institution GOVERNMENT CHEMICAL INDUSTRIAL RESEARCH INSTITUTE, TOKYO

Name of Department or Institute 2nd Division

Name to Whom Queries Should Be Addressed C. Matsumura

$C_2H_4Cl_2$  1:2-Dichloroethane C. Matsumura Spectrum assigned



13. HARVARD UNIVERSITY  
 Department of Chemistry  
 Cambridge, Massachusetts 02138  
 Prof. E. B. Wilson

$C_4H_7N$ ( $CH_3CH_2CH_2NC$ )	n-Propyl isonitrile	M. Fuller	Ground and excited states assigned for two rotamers
$C_2H_5NO_3$ ( $HOCH_2CH_2NO_2$ )	2-Nitroethanol	M. Fuller	In progress
$C_7H_6O_2$	6-Hydroxy-2-formylfulvene	H. M. Pickett	Ground and first excited state spectra assigned
$C_7H_6O_2$	Tropolone	H. M. Pickett	Several lines assigned
$C_2H_5NO_3$	Ethyl Nitrate	D. G. Scroggin	Ground and excited states assigned for two rotamers
$C_3H_6O$	Propanal (Propionaldehyde)	D. G. Scroggin	Gauche ground state splittings
$C_2H_4F_3N$ ( $CF_3CH_2NH_2$ )	Trifluoroethylamine	I. D. Warren	Ground and excited states assigned for three isotopes
$C_5H_8$	1-Pentyne	F. Wodarczyk	Manuscript in preparation
$C_3H_4ClN$ ( $ClCH_2CH_2CN$ )	3-Chloropropionitrile	I. D. Warren	Several lines assigned for one rotamer

14. HEWLETT-PACKARD COMPANY  
 SCIENTIFIC INSTRUMENTS DIVISION  
 LeROY H. SCHARPEN

$C_5H_{10}Cl_2$	2,4-dichloropentane	One conformation identified for meso and one for <u>racemic</u> form.
$C_5H_{11}Cl$	1-chloro-3-methylbutane	Two conformations identified for each.
$C_5H_{11}Br$	1-bromo-3-methylbutane	
$C_8H_{11}N$	2-norbornanecarbonitrile	B + C determined for <u>endo</u> and <u>exo</u> forms.

15. Name of Institution University of Illinois  
 Name of Department or Institute Department of Chemistry  
 Name to Whom Queries Should be Addressed W. H. Flygare

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STAGE OF PROGRESS</u>
C <sub>7</sub> H <sub>8</sub>	bicyclo[2.2.1]heptadiene	T. Gierke	in progress
C <sub>3</sub> OH <sub>2</sub>	cyclopropeneone	R. Benson	in progress
C <sub>4</sub> OH <sub>4</sub>	methylcyclopropeneone	R. Benson	in progress
C <sub>4</sub> NH <sub>5</sub>	methylacrylonitrile	C. Norris	completed
C <sub>5</sub> OH <sub>6</sub>	3-cyclopentenone	C. Norris	assigned
C <sub>6</sub> O <sub>2</sub> H <sub>4</sub>	2-pyrone	C. Norris	assigned
C <sub>5</sub> O <sub>2</sub> H <sub>4</sub>	2-cyclopentene-1,4-dione	S. Rock	in progress
C <sub>7</sub> H <sub>7</sub>	bicycloheptatriene	T. Gierke S. Hartford R. Benson	in progress

6. Name of Institution University of Kansas  
 Name of Department of Institute Department of Chemistry  
 Name to Whom Queries Should Be Addressed Marlin D. Harmony

<u>FORMULA</u> *	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u> **	<u>PRESENT STAGE OF PROGRESS</u>
CH <sub>6</sub> N <sub>2</sub> (NH <sub>2</sub> -NHCH <sub>3</sub> )	Methyl hydrazine	Lattimer	Experimental work published; theoretical work in progress.
CH <sub>5</sub> NO (CH <sub>3</sub> -O-NH <sub>2</sub> )	Methoxyamine	Johnson	In progress.
C <sub>4</sub> H <sub>9</sub> N (C <sub>4</sub> H <sub>7</sub> -NH <sub>2</sub> )	Cyclobutylamine	Fong	Assignment nearly complete.
C <sub>5</sub> H <sub>8</sub>	Bicyclo[2.1.0]pentane	Suenram	Normal isotopic species completed.
C <sub>3</sub> H <sub>7</sub> N (C <sub>3</sub> H <sub>5</sub> -NH <sub>2</sub> )	Cyclopropylamine	Hendricksen	Search for C <sup>13</sup> species.

17. Abteilung Chemische Physik  
im Institut für Physikalische Chemie  
Universität Kiel, Olshausenstraße 40/60  
Prof. Dr. H. Dreizler

$C_2H_3SN$ ( $CH_3SCN$ )	Methylthiocyanate	U. Andresen D. Sutter	Analysis of excited states Zeeman-studies
$C_3H_5N$ ( $CH_3CH_2CN$ )	Ethyleyanide	H. Mäder	" " "
$C_2H_3D_3S_2$ ( $CH_3SSCD_3$ )	Dimethyldisulfide- $d_3$	M. Kuhler	" "
$CH_3ClS$ $CH_3SCL$	Methylsulfenyl chloride	A. Guarnieri B. Kück	Isotopic species $d_3$ , $S^{34}$ , analysis of excited states
$C_5H_4FN$ $C_5H_4NF$	2-fluoropyridine	D. Sutter	Manuscript prepared
$C_2H_6N_2O$ ( $CH_3$ ) $_2$ NNO	Dimethylnitrosamine	U. Andresen H. Dreizler	assignment in progress
$C_2D_6S$ ( $CD_3$ ) $_2$ S	Dimethylsulfide- $d_6$	E. Hamer	Zeeman-studies
NSCl	Thionitrosyl chloride	A. Guarnieri	electric dipole moment N-quadrupole coupling constants
NOF	Nitrosyl fluoride	A. Guarnieri	Zeeman studies

Universität Kiel, West Germany

18. Name of Institution

Name of Department or Institute Institute für Physikalische Chemie

Name to Whom Queries Should Be Addressed Manfred Winnewisser

CHNO (HCNO)	Fulminic Acid	Manfred Winnewisser Brenda P. Winnewisser	Rotation-Vibration-Interaction paper in pr.
CDNO (DCNO)	Deutero Fulminic Acid	Fritz Kie	IR- Wave Spectra Stark-effect. In Progress.

19. Kyushu University  
Department of Chemistry  
Eizi Hirota

$C_5H_8$ [CH <sub>2</sub> =CHCH <sub>2</sub> CH=CH <sub>2</sub> ]	1,4-Pentadiene	T. Shigemune E. Hirota	One rotamer assigned.
ClNS (NSCl)		S. Mizumoto J. Izumi	Stark effect and centrifugal distortion; work in progress.
F <sub>3</sub> P (PF <sub>3</sub> )	Phosphorus trifluoride	E. Hirota	In press (J. Mol. Spectrosc.).
O <sub>2</sub>	Oxygen	T. Amano	Manuscript in preparation.
C <sub>8</sub> H <sub>13</sub> F, C <sub>8</sub> H <sub>13</sub> Cl $\begin{array}{c} \text{CH}_2\text{CH}_2 \\ \diagup \quad \diagdown \\ \text{HC}-\text{CH}_2\text{CH}_2-\text{CX} \\ \diagdown \quad \diagup \\ \text{CH}_2\text{CH}_2 \end{array}$ (X=F, Cl)	1-Fluoro <sup>-</sup> and 1-Chloro <sup>-</sup> bicyclo[2.2.2]octane	E. Hirota	In press (J. Mol. Spectrosc.).
CH <sub>3</sub> F	Methyl fluoride	T. Tanaka	Vibration-rotation interaction; work in progress.
F <sub>2</sub> Si (SiF <sub>2</sub> ) <sub>2</sub>	Silicon difluoride	H. Shoji	ν <sub>1</sub> and ν <sub>3</sub> Spectra assigned.
AsF <sub>3</sub>	Arsenic trifluoride	T. Chikaraishi	Vibration-rotation interaction; work in progress.
CH <sub>3</sub> NS (CHSNH <sub>2</sub> )	Thioformamide	R. Sugisaki	Assigned.
CH <sub>6</sub> Si (CH <sub>3</sub> SiH <sub>3</sub> )	Methyl silane	E. Hirota	Vibration-internal rotation- overall rotation interaction; work in progress.
C <sub>7</sub> H <sub>13</sub> N $\begin{array}{c} \text{CH}_2\text{CH}_2 \\ \diagup \quad \diagdown \\ \text{HC}-\text{CH}_2\text{CH}_2-\text{N} \\ \diagdown \quad \diagup \\ \text{CH}_2\text{CH}_2 \end{array}$	Quinuclidine	S. Suenaga	Skeletal torsion; work in progress.
CNO (NCO)		T. Amano	Excited vibrational state ( <sup>2</sup> Δ <sub>3/2</sub> , <sup>2</sup> Δ <sub>5/2</sub> ); manuscript in preparation.
BrO	Bromine monoxide	A. Yoshinaga	Excited vibrational state; work in progress.
C <sub>2</sub> H <sub>6</sub> (CH <sub>3</sub> CD <sub>3</sub> )	Ethane	E. Hirota	Spectrum assigned; manuscript submitted to J. Chem. Phys.

20. Name of Institution: UNIVERSITE LAVAL  
 Chemistry Department, Quebec, Canada  
 P. Buckley

$C_3H_8O_2 (CH_3OCH_2CH_2OH)$	2-methoxyethanol	M. Brochu	Spectrum of normal and OD species assigned, manuscript in progress.
$CF_4O (CF_3OF)$	Trifluoromethylhypofluorite	J. Weber	Ground state spectrum assigned.

21. NAME OF INSTITUTION : UNIVERSITE DE LILLE

NAME OF DEPARTMENT OR INSTITUTE : Département de Physique - Laboratoire de spectroscopie hertzienne - Equipe de recherche associée au CNRS.

NAME TO WHOM QUERIES SHOULD BE ADDRESSED : M. WERTHEIMER.

FORMULA	NAME OF COMPOUND	NAME OF INVESTIGATOR.	PRESENT STAGE OF PROGRESS.
H COOH	Formic Acid	SAMSON	√7 and √9 excited states (Coriolis resonance) manuscript in preparation.
H COOH	Formic Acid	SAMSON WILLEMOT DANGOISSE	√6 and √8 excited states. Spectrum assigned.
$(H_2CO)_3$	Trioxane	COLMONT	Excited states in progress.
$(H_2CO)_2H_2C^{13}O$	"	COLMONT	Ground state Spectrum assigned
SO <sub>2</sub>	Sulfur dioxide	BELLET	Ground and excited states
H <sub>2</sub> CO	Formaldéhyde	BELLET	Spectrum assigned
$H_2O^{16}, HDO^{16}, D_2O^{16}$ $H_2O^{17}, HDO^{17}, D_2O^{17}$ $H_2O^{18}, HDO^{18}, D_2O^{18}$	Water	Bellet	Spectrum assigned Manuscript in preparation.
$C_2H_3N (CH_3NC)$	Methyl isocyanide	BAUER BOGEY GODON	Excited vibrational states (N <sup>14</sup> and N <sup>15</sup> )
SO Cl <sub>2</sub>	Chlorure de thionyle	JOURNEL DUBRULLE DESTOMBES	Spectrum assigned
SO <sub>2</sub> Cl <sub>2</sub>	Chlorure de sulfuryle	MARLIERE BURLE	Spectrum assigned.

## 22. UNIVERSITY COLLEGE LONDON

Department of Chemistry

London, England

D. J. Millen

$\text{TeF}_5\text{Cl}$	Tellurium chloride pentafluoride	A.C. Legon	Spectrum interpreted
$\text{HOCl}$	Hypochlorous acid	D. Lister	Dipole moment determined. In press.
$\text{C}_5\text{H}_6\text{O}$ $(\text{CH}_2-\text{CH}_2-\text{CH}=\text{CH}-\text{CO})$	Cyclopent-2-en-1-one	D. Chadwick A.C. Legon	Vibrational states analysed. Planarity establi- shed.
$\text{C}_5\text{H}_6\text{O}$ $(\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-\text{CO})$	Cyclopent-3-en-1-one	A.C. Legon	Spectrum assigned
$\text{C}_4\text{H}_7\text{NO}$ $(\text{CH}_2-(\text{CH}_2)_2-\text{NH}-\text{CO})$	pyrrolidone	J. W. Bevan A. C. Legon	spectrum assigned.
$\text{C}_4\text{H}_6\text{O}_2$ $(\text{CH}_2-(\text{CH}_2)_2-\text{O}-\text{CO})$	$\delta$ -butyrolactone	J. W. Bevan A. C. Legon	Preliminary publication. Further work in progress.
$\text{C}_4\text{H}_4\text{O}_2$ $(\text{O}-\text{CH}_2-\text{CH}=\text{CH}-\text{CO})$	$\gamma$ -crotonolactone	A. C. Legon	Preliminary publication. Further work in progress.
$\text{CH}_2\text{Br}_2$	Methylene bromide	D. Chadwick	Manuscript in press.
$\text{C}_{10}\text{H}_{15}\text{CN}$	Adamantyl cyanide	D. Chadwick A. C. Legon	Spectrum of isotopic species studied. Manuscript in preparation.
$\text{NH}_2\text{Cl}$	Chloramine	D. Lister	Dipole and structure determined. Manuscript in press.

23. UNIVERSITE DE LOUVAIN (Belgium)  
 Laboratoire de Spectroscopie Moléculaire  
 Professeur M. de HEMPTINNE  
 Parc d'Arenberg  
 B - 3030 HEVERLEE

$C_2H_3Br$ ( $CH_2 = CHBr$ )	Vinyl Bromide	J. Maroor	Isotopic studies continuing. r structure. <sup>S</sup> Quadrupole coupling up to second order.
$C_2H_6O$ ( $CH_3CH_2OH$ )	Ethyl Alcohol	J.P. Culot	New assignment (14 isotopic species). Trans conformer completed ( $V_3$ barrier, r structure). <sup>S</sup> Analysis of gauche spectrum continuing.
$H_2O$	Water	G. Steenbeckeliers	Stable isotopic species.
$SO_2$	Sulfur Dioxide	G. Steenbeckeliers	Excited states.
$SO_2$ ( $^X S ^Y O ^Z O$ )	Sulfur Dioxide	R. Van Riet	Isotopic studies continuing.

24. No listing

5. Name of Institution University of Maryland

Name of Department or Institute Institute for Molecular Physics

Name to Whom Queries Should Be Addressed Lawrence C. Krisher

$C_5H_4O_3$	Citraconic anhydride	S. Wolf	In progress.
$C_2H_4O_2$	Acetic acid	E. Saegerbarth L. Krisher	Submitted.
$C_2H_3O_2$ ( $CD_3COOH$ ) $2\ 3\ 2\ 3$			
$SnH_3Cl$	Chloro-stannane	L. Krisher	In press.
$SnH_3Br$	Bromo-stannane	L. Krisher S. Wolf	Manuscript in prep.
$SnH_3F$	Fluoro-stannane	L. Krisher S. Wolf	In progress.

Name of Institution University of Michigan

Name of Department or Institute Chemistry

Name to Whom Queries Should Be Addressed R. L. Kuczkowski

$^{14}O_3$	1,2-4 trioxacyclopentane	C. Gillies	Structure Done
$^{31}P(P(CH_3)_3)$	Trimethylphosphine	P. Bryan	Deuterated species assigned;
$^{11}B^{10}P(H_3B-P(CH_3)_3)$	Trimethylphosphine Borane	P. Bryan	Structure Done
$^{10}BP(H_3BPH_2CH_3)$	Methy phosphine Borane	P. Bryan	Structure Done
$^{31}P_2(H_2PPF_2)$	phosphino difluorophos- phine	H. Schiller	Structure Done
$O_3$	dinitrogen trioxide	R. Kuczkowski	vib. satellites
$^{19}F_2H_3P(F_2ClP-BH_3)$	chlorodifluorophosphine borane	P. Bryan	Spec. Obs.



Name of Institution Michigan State University, East Lansing, Michigan 48823

Name of Department or Institute Department of Chemistry

Name to Whom Queries Should Be Addressed R. H. Schwendeman

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STAGE OF PROGRESS</u>
$C_5H_8$ ( $\underline{CH_2CH_2CHCH_2}$ )	Vinylcyclopropane	E. Coddig	Manuscript in Preparation
$C_5H_8O$ ( $\underline{CH_2CH_2CHCOCH_3}$ )	Cyclopropyl Methyl Ketone	P. Lee	Manuscript in Preparation
$C_3H_4O_2$ ( $\underline{CH_2OCHCHO}$ )	Glycidaldehyde	P. Manor	Manuscript in Preparation
$C_3H_7NO$ ( $RCN(CH_3)_2$ )	Dimethylformamide	A. Brittain	Parent and $d_7$ assigned
$C_4H_8O$ ( $CH_3CH_2CH_2CHO$ )	n-Butyraldehyde	P. Lee	Two rotamers assigned
$ClF_2P$ ( $PF_2Cl$ )	Chlorodifluorophosphine	A. Brittain J. Smith	Manuscript Complete
$F_2H_2NP$ ( $PF_2NH_2$ )	Aminodifluorophosphine	A. Brittain J. Smith	Manuscript Complete
$CF_2NP$ ( $PF_2CN$ )	Cyanodifluorophosphine	P. Lee	Manuscript in Preparation
$CF_2N_2$ ( $NF_2CN$ )	Difluorocyanamide	P. Lee	Parent and $^{13}C$ assigned
$CH_3F_2P$ ( $CH_3PF_2$ )	Methyldifluorophosphine	E. Coddig	Parent assigned
$CH_3F_2OP$ ( $CH_3OPF_2$ )	Methoxydifluorophosphine	E. Coddig C. Jones	Parent and $^{13}C$ assigned

8. Name of Institution Mississippi State University

Name of Department or Institute Department of Physics

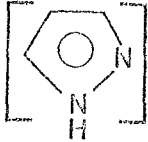

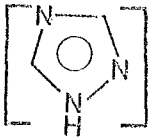
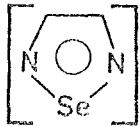
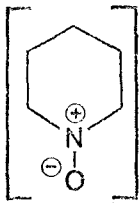
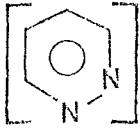
Name to Whom Queries Should Be Addressed Gordon Jones

$C_5H_{10}O$ ( $(CH_3)_3C-CHO$ )	Pivaldehyde	Manfred Winnewisser Tom Walén	Q-branch spectrum
$C_5H_9NO$ ( $(CH_3)_3C-CNO$ )	Pivalonitrile-N-oxide	Gordon Jones Manfred Winnewisser	Spectrum assign.

29. Name of Institution: MORASH UNIVERISTY

Name of Department: CHEMISTRY DEPARTMENT

Name to Whom Queries Should Be Addressed: PROFESSOR R. D. BROWN, DR. F.R: BURDEN

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STAGE OF PROGRESS</u>
$S_2Cl_2$	sulphur monochloride	P. Blackburn	work in progress
$C_6H_6$	fulvene	J. E. Kent G. L. Blackman	Zeeman studies proceeding
	dimethylenecyclobutene	"	"
$CN_4$	$NC.N_3$ cyanogen azide	K. Bolton	spectrum assigned Stark measurements complete. Quadrupole study in progress
$C_3H_4N_2$	 pyrazole	A. Mishra	quadrupole coupling constants - nondiagonal elements. Paper in press
$C_3H_4N_2$	 imidazole	I. Elsum	quadrupole coupling analysis in progress
$C_2H_3N_3$	 1, 2, 4-triazole	A. Mishra	spectrum assigned Stark measurements complete. Quadrupole coupling analysis in progress.
$C_2H_2N_2Se$	 selenadiazole	A. Mishra	quadrupole coupling and $^{13}C$ studies proceeding
$CrF_4$	chromium (IV) fluoride	P. Burton	work continuing
$NF_2$	nitrogen (II) fluoride	I. Gillard J. Crofts	lines measured tentative assignment
$C_5H_5NO$	 pyridine N-oxide	W. Garland	quadrupole coupling and study of isotopic species commenced
$C_4H_4N_2$	 pyrimidine	E. Clarke	study of isotopic species in progress

30. UNIVERSITY OF NANCY  
 Laboratoire de Chimie Théorique  
 Nancy, France  
 J. Barriol/G. Roussy

$C_3H_7N$ ( $CH_2=CHCH_2NH_2$ )	Allylamine	G. Roussy	-Ncis rotamer in Press
		G. Roussy, in collaboration with Freiburg	-Gauche rotamer in Progress
$C_4H_5NS$ ( $CH_2=CHCH_2NCS$ )	Allyl isothiocyanate (allyl mustard oil)	A. Bouchy	-Work commenced
$C_4H_3N$ ( $CH_2=C=CHCN$ )	Cyanoallene	J. Demaison	-Paper in preparation
$C_3H_3Cl$ ( $CH_2=C=CHCl$ )	Chloroallene	J. Demaison	-Temporarily interrupted
$C_3H_3Br$ ( $CH_2=C=CBr$ )	Bromoallene	J. Demaison	-Studying quadrupole interaction
$C_3H_3F$ ( $CH_2=C=CF$ )	Fluoroallene	J. Demaison	-Temporarily interrupted

Name of Institution National Bureau of Standards

Name of Department or Institute Molecular Spectroscopy

Name to Whom Queries Should Be Addressed William H. Kirchhoff

BF	Boron Fluoride	D.R. Johnson F. Lovas	paper submitted
CHN (HCN)	Hydrogen Cyanide	A. Maki D. Johnson G. Winnewesser	HCN, DCN excited states paper submitted
CH <sub>2</sub> S (H <sub>2</sub> CS)	Thioformaldehyde	D. Johnson W. Kirchhoff	Centrifugal Distort. All isotopes Paper submitted.
CH <sub>3</sub> FO <sub>2</sub> S (CH <sub>3</sub> FSO <sub>2</sub> )	methyl sulfonyl fluoride	E. J. Jacob	paper submitted
CF <sub>2</sub>	carbon difluoride	F. X. Powell W. Kirchhoff	manuscript in preparation
CF <sub>6</sub> Si (CF <sub>3</sub> SiF <sub>3</sub> )	hexafluoro methyl silane	D. Johnson W. Kirchhoff	Spectrum assigned
COS (OCS)	carbonyl sulfide	A. Maki	<sup>13</sup> C, <sup>18</sup> O excited vibrational states
C <sub>2</sub> HBF <sub>2</sub> (HC≡CBF <sub>2</sub> )	ethynyl difluoro borane	W. Lafferty	in press
C <sub>2</sub> H <sub>6</sub> SO <sub>2</sub> ((CH <sub>3</sub> ) <sub>2</sub> SO <sub>2</sub> )	dimethyl sulfone	E. J. Jacob	paper submitted
C <sub>3</sub> H <sub>8</sub> Si (CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> SiH <sub>2</sub> )	silacyclobutane	W. Lafferty W. Pringle	in press
C <sub>3</sub> F <sub>6</sub> (CF <sub>2</sub> =CF CF <sub>3</sub> )	hexafluoropropene	E. J. Jacob	Spectrum assigned
C <sub>4</sub> H <sub>10</sub> Si (CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> SiH <sub>2</sub> )	silacyclopentane	W. Lafferty J. Durig	manuscript in preparation
F <sub>2</sub> S	sulfur difluoride	D. Johnson W. Kirchhoff	manuscript in preparation

32. Name of Institution University of New Brunswick  
 Name of Department or Institute Departments of Physics and Chemistry  
 Name to Whom Queries Should be Addressed Dr. K.V.L.N. Sastry

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STATE OF PROGRESS</u>
$\text{CH}_4\text{O}(\text{CH}_3\text{OH})$	Methyl alcohol	R.M. Lees	Spectra of Deuteromethanols assigned
$\text{C}_2\text{H}_2\text{F}_3$	Trifluoroethylene	S.C. Dass and A. Bhaumik	Excited vibrational states assigned
$\text{C}_6\text{H}_3\text{F}_3$	1,2,4 Trifluorobenzene	F. Ayer	In progress
$\text{C}_4\text{H}_5\text{OF}$	Epifluorohydrin	A. Bhaumik and S.C. Dass	Accepted for publication
$\text{C}_3\text{H}_6\text{O}_2$ ( $\text{C}_2\text{H}_3\text{O}-\text{CH}_2\text{OH}$ )	Glycidol	W.V.F. Brooks and K.V.L.N. Sastry	In progress

39. NEW YORK UNIVERSITY  
 DEPARTMENT OF CHEMISTRY  
 Bronx, N. Y.  
 R. Varma

$\text{CH}_3\text{FGe}[\text{CH}_3\text{GeH}_2\text{F}]$	Methyl Germyl Fluoride	R. Varma J.F. Roberts J. F. Nelson	a-type transition of the parent and $\text{C}^{13}$ assigned. Barrier determine
$\text{CD}_3\text{H}_2\text{FGe}[\text{CD}_3\text{GeH}_2\text{F}]$	Deutro Methyl Germyl Fluoride	R. Varma R. F. Roberts	a-type transition assigned and Barrier Determine
$\text{H}_5\text{PSi}[\text{SiH}_3\text{PH}_2]$	Silyl Phosphene	R. Varma K. R. Ramaprasad J. F. Nelson	a and c-type transitions assigned work in progress.
$\text{H}_5\text{PSi}_2(\text{SiH}_3)_3\text{P}$	Trisilyl Phosphene	R. Varma J. DiGiacomo	Spectra Assigned

34. University College of North Wales, Bangor, Caerns., U.K.  
 Department of Chemistry,

JOHN SHERIDAN,

<u>Formula</u>	<u>Name of Compound</u>	<u>Name of Investigator</u>	<u>Present Stage of Progress</u>
$C_4H_8O$	Ethyl vinyl ether	N. L. Owen	Manuscript in preparation
$C_3H_6O_3$	Dimethyl carbonate	N. L. Owen	Work temporarily abandoned
$C_7H_7FO$	p-Fluoroanisole	N. L. Owen	Work continuing
$C_3H_6O$	cyclopropanol	J. N. Macdonald	Work continuing. Vibration-rotation interactions
$C_4H_5NO$	5-Methyl isoxazole	J. N. Macdonald	Work continuing
$C_4H_5NS$	3-Methyl thiazole	H. U. Wenger	Many lines measured. Proceeding to double-resonance checks.
$C_3H_4S$	Propargyl mercaptan	F. Scappini	Double resonance studies
$C_3H_8S$	iso-propyl mercaptan	J. H. Griffiths	Analysis continuing for gauche form (work transferred from University of Texas)
$C_3H_4N_2$	imidazole	J. H. Griffiths	Work resumed to get complete structure
$C_4H_6O_2$	cyclopropane carboxylic acid	T. D. Summers	Many lines measured. Proceeding to double resonance checks.
$C_3F_4$	Perfluoro propyne	T. D. Summers	$B_0$ , $D_{JK}$ , vibrational states
$C_2H_2N_2S$	2,4-thiadiazole	D. Norbury	Refined constants, $^{34}S$ -species; dipole
$C_2H_2N_2O$	2,4-oxadiazole	D. Norbury	Work resumed to refine structure

34. Continued

$C_3H_5FO$	Propionyl fluoride	O. L. Stiefvater	CGCO structure by double resonance (DR) nearly complete
$C_3H_6O$	Propionic acid	O. L. Stiefvater	I. Heavy skeleton structure by DR in progress. II. Interaction of internal rotation (I) with CC torsion (T) and CCC deformation (D) observed on $(T, I, D) = (0, 1, 0)$ , $(0, 2, 0)$ , $(1, 1, 0)$ , $(2, 1, 0)$ , $(3, 1, 0)$ , $(1, 2, 0)$ , $(0, 1, 1)$ , $(1, 1, 1)$ .
$C_4H_8O$	Isobutyraldehyde	O. L. Stiefvater	DR assignments of G.S. and 3 torsional states of <i>trans</i> and <i>gauche</i> forms. Tunneling splittings for $T = 2, 3$ determined. Int. notes and other vibrational states assigned. Dipole moments and intensities in progress.
$C_4H_7FO$	Isobutyryl fluoride	O. L. Stiefvater	DR search for second rotamer commenced.

35. Name of Institution University of Oslo  
 Name of Department or Institute Department of Chemistry  
 Name to Whom Queries Should Be Addressed K.M. Marstokk/H. Kjellendal

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STAGE OF PROGRESS</u>
$C_3BrN$ (BrCCCN)	Bromocyanoacetylene	T. Bjorvatten	
$C_3ClN$ (ClCCCN)	Chlorocyanoacetylene	T. Bjorvatten	Manuscript in preparation
$C_3IN$ (ICCCN)	Iodocyanoacetylene	T. Bjorvatten	
$C_2H_6O_2$ (HOCH <sub>2</sub> -CH <sub>2</sub> OH)	Ethyleneglycol	H. Kjellendal	Work continued at the University of Texas at Austin
$C_3H_5NS$ (CH <sub>3</sub> CH <sub>2</sub> SCN)	Ethylthiocyanate	A. Bjørseth	Spectrum assigned
$C_3F_3Cl$ (CF <sub>3</sub> CCCl)	Trifluoromethylchloroacetylene	A. Bjørseth	Spectrum assigned



5. Name of Institution The Pennsylvania State University, University Park, Pa. 16802  
 Name of Department or Institute Chemistry Department  
 Name to Whom Queries Should Be Addressed L. Peter Gold

$\text{CH}_5\text{As}$ ( $\text{CH}_3\text{AsH}_2$ )	methylarsine	D. Levine	normal species complete; isotopes in progress.
$\text{C}_2\text{H}_7\text{As}$ ( $(\text{CH}_3)_2\text{AsH}$ )	dimethylarsine	D. Levine	normal and one deuterated species complete; other isotopes in progress.
$\text{CH}_2\text{N}_4$ ( $\text{CH-N-N-N-NH}$ )	tetrazole	W. Krugh	Q-branch assigned

Name of Institution PRINCETON UNIVERSITY  
 Name of Department or Institute CHEMISTRY  
 Name to Whom Queries Should Be Addressed VICTOR LAURIE

$\text{C}_7\text{H}_9\text{Cl}$	4-Chloronortricyclene	W. Stigliani	$^{13}\text{C}$ isotopic species assigned
$\text{C}_{10}\text{H}_{10}$	Bullvalene	W. Stigliani	Ground and excited vibrational states
$\text{C}_2\text{H}_4\text{O}$	Acetaldehyde	K. Lau	New internal rotation analysis
$\text{SiH}_3\text{F}$	Fluor <sup>o</sup> silane	B. Ravid	Accurate dipole moment and deuterium isotope effect. Sign of dipole moment

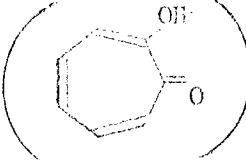
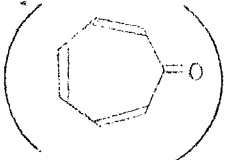
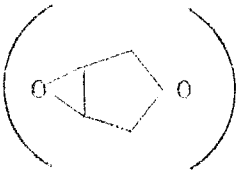
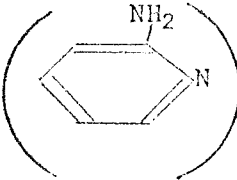
Name of Institution QUEEN'S UNIVERSITY, KINGSTON ONTARIO  
 Name of Department or Institute CHEMISTRY  
 Name to Whom Queries Should Be Addressed R. KENLEY

$\text{C}_4\text{H}_8\text{C}_2$	1,3-DICUMENE	R. Kenley	Q-branch assigned.
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39. Name of Institution: University of Reading, Berkshire, England.

Name of Department or Institute: Department of Chemistry

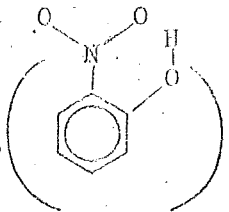
Name to Whom Queries Should be Addressed: J.M. Mills

<u>FORMULA</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR</u>	<u>PRESENT STAGE OF PROGRESS</u>
$C_7H_6O_2$ 	Tropolone	R.A. Creswell	Spectrum obtained
$C_7H_6O$ 	Tropone	R.A. Creswell	Normal species assigned Deuterated species in preparation
$C_4H_6O_2$ 	3,6 dioxabicyclo [3.1.0]hexane	R.A. Creswell	Assignment being sought
$C_3H_4$ ( $CH_3C \equiv C-H$ )	Methylacetylene	M. Bertram	Excited vib. states
$F_3HSi$	Trifluorosilane	A.R. Hoy	Excited vib. states
$H_2O$	Water	W.J. Lafferty	Ground & excited states of normal and deuterated species
$C_5H_6N_2$ 	2-aminopyridine	R.A. Kydd	Spectrum of normal species assigned. Vib. states assigned. Deuterated species being studied.

Name of Institution Rice University

Name of Department or Institute Chemistry Department

Name to Whom Queries Should Be Addressed Robert F. Curl

<u>FORMULA*</u>	<u>NAME OF COMPOUND</u>	<u>NAME OF INVESTIGATOR**</u>	<u>PRESENT STAGE OF PROGRESS</u>
$C_6H_6OSi(CH_3)_3$	Silyl methyl ether	C. Le Croix	Spectrum assigned
$C_2F_3H_3Si(SiF_3CH_2CH_2)$	Vinyl trifluorosilane	H. Jones	Spectrum assigned
$C_2H_7NO(CH_2OHCH_2NH_2)$	2-Aminoethanol	R. Penn	Manuscript submitted
$C_3C_1H_3O(CH_2=CH-COCl)$	Acryloyl chloride	D. Hemphill	Trans conformer assigned
$C_4H_6O(CH_2=CH-O-CH=CH_2)$	Divinyl ether	C. Hirose	Cis-trans conformer assigned manuscript in press
$C_6H_5NO_3$	 o-nitrophenol	S. Leavell	Normal species assigned
$F_2Ge$	Germanium difluoride	H. Takeo	Manuscript in press

11. Name of Institution Nagasaki Chemical Research Center

Name of Department or Institute Kanagawa-Ken, Japan

Name to Whom Queries Should Be Addressed YOSHIO ICHINO

OS	$SO(\frac{1}{2}\Delta)$ radical	S. Saito	J=3/2 transition; J. Chem. Phys. <u>52</u> , 2544 (1970).
$C_3H_2F_3$ ( $CF_2CH=CH_2$ ),	3,3,3-trifluoro- propene	S. Saito	Isotopic work in progress.
$C_2H_6O_2S$ ( $(CH_3)_2SO_2$ ),	Dimethylsulfone	S. Saito	Isotopic work in progress.

12. Name of Institution :: Saha Institute of Nuclear Physics

Name of Department or Institute :: Microwave Spectroscopy Section

Name to Whom Queries Should Be Addressed :: Professor D. K. Ghosh  
92, Acharja Profulla Chandra Road  
Calcutta 9, India

FORMULA	NAME OF COMPOUND	NAME OF INVESTI- GATOR	PRESENT STAGE OF PROGRESS
=====	=====	=====	=====
1. $C_3H_7NO$ $\left[ (CH_3)_2NCHO \right]$	Dimethyl Formamide	R. Nundy A. Chatterjee D. K. Ghosh	In progress
2. $C_5H_4ClN$	3-chloropyridine	R. Nundy A. Chatterjee D. K. Ghosh	In progress

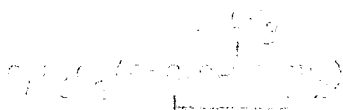
43. UNIVERSITY OF SOUTH CAROLINA  
 Department of Chemistry  
 Columbia, S. C. 29208  
 J. R. Durig



Bicyclo(2.1.1)hex-2-ene

D. Johnston

Ground and excited vibrational states, preparation in progress



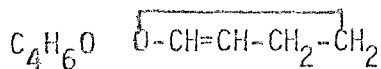
Bicyclo(2.1.1)hexane

M. DeWitt

Spectrum assigned

44. UNIVERSITY OF SOUTH CAROLINA

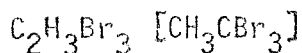
Department of Chemistry  
 Columbia, S. C. 29208  
 J. R. Durig



2,3-Dihydrofuran

Tong

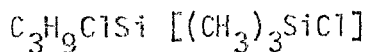
Spectrum assigned for five vibrational states



Methylbromofom

Kizer

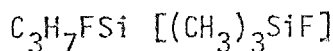
Manuscript in preparation



Trimethylchlorosilane

Carter

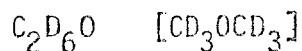
Normal and deuterated species in progress



Trimethylfluorosilane

Li

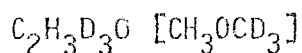
Normal species done, deuterated species in progress



Dimethylether

Li

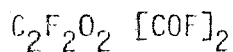
Torsional excited line assigned state



Dimethylether

Li

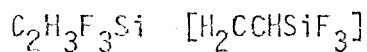
Torsional work



Oxalyl fluoride

Brown

Work in progress



Trifluorovinylsilane

Witt

Work in progress

Name of Institution University of Southern California

Name of Department or Institute Department of Chemistry

Name to Whom Queries Should Be Addressed Dr. Robert A. Beaudet

$C_2B_3H_7$	dicarbopentaborane(7)	Linda Li	Spectrum assigned
$C_3B_3H_7$	tricarbopentaborane(7)	J. Pasinski	Spectrum assigned
$CB_5H_7$	carbapentaborane(7)	G. McKown	assigning deuterated species
$SiH_3SiF_3$	plus molecules listed previously	J. Pasinski	assigned

46. UNIVERSITY OF SUSSEX  
The Chemical Lab  
Palmer Brighton BN1 9QJ, England  
H. W. Kroto

$CN_4$ ( $NCN_3$ )	Cyanogen azide	C. C. Costain	Manuscript in preparation
$CH_3Cen$ ( $CeH_3CN$ )	German cyanide	A. Careless	Vibration-rotation analysis

47. SWISS FEDERAL INSTITUTE OF TECHNOLOGY

Laboratory for Physical Chemistry

Zurich, Switzerland

Hs. H. Günthard / A. Bauder

$C_3H_7N$	$(CH_3CH=NCH_3)$	N-Methylethylidenimine	J.Meier	Manuscript submitted
$C_6H_6O$		Phenol	E.Mathier	Manuscript in press (J.Mol.Sp.)
$C_{10}H_8$		Azulene	P.Christen	Manuscript prepared
$C_2H_3NO_2$	$(CH_2=CHNO_2)$	Nitroethylene	P.Nösberger	Excited states
$C_3H_5I$	$(CH_2=CI CH_3)$	2-Iodopropene	A.Bauder H.U.Wenger	First torsionally excited state

48. UNIVERSITY OF TEXAS  
 Department of Chemistry  
 Austin, Texas  
 J. E. Boggs

$C_4H_5N$	$(\text{CH}_2-\text{CH}_2-\text{CH}-\text{CN})$	Cyclopropylcyanide	R. Penn	Isotopic species assigned.
$C_4H_8O$	$(\text{CH}_2-\text{CH}_2-\text{CH}-\text{O}-\text{CH}_2)$	Cyclopropyl methyl ether	R. Penn	Partial assignment.
$C_3H_9N$	$((\text{CH}_2)_2\text{CHNH}_2)$	Isopropylamine	L. Griffin	Partial assignment.
$C_3H_8S$	$((\text{CH}_2)_2\text{CHSH})$	Isopropylmercaptan	J. Griffiths	Normal, deuterated, and $S^{34}$ species. Trans and gauche conformers. Internal rotation.
$C_3H_5NO_2$	$(\text{CH}_2-\text{CH}_2-\text{CH}-\text{NO}_2)$	Nitrocyclopropane	A. Mochel	Normal and deuterated species. Internal rotation.
$C_5H_8$	$((\text{CH}_2)_2\text{CH}-\text{C}\equiv\text{CH})$	Isopropylacetylene	A. Mochel	Normal and deuterated species.
$C_2H_6O_2$	$(\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH})$	Ethylene glycol	H. Møllendal	Partial assignment.
$C_3H_2O_3$	$(\text{O}-\text{CH}=\text{CH}-\text{O}-\text{C}=\text{O})$	Vinylene carbonate	W. White	All $C^{13}$ and $O^{18}$ isotopes. Paper submitted.
$C_5H_6$	$(\text{CH}_2-\text{CH}_2-\text{CH}-\text{C}\equiv\text{CH})$	Cyclopropylacetylene	M. Collins	Paper submitted.
$C_4H_4O$	$(\text{O}-\text{CH}_2-\text{CH}-\text{C}\equiv\text{CH})$	Epoxybutyne	M. Collins	Paper submitted.

49. Texas Tech University  
 Department of Physics  
 Lubbock, Texas 79409

C. R. Quade

FORMULA	NAME OF COMPOUND	NAME OF INVESTIGATOR	PRESENT STAGE OF PROGRESS
CH <sub>2</sub> DOH CHD <sub>2</sub> OH CH <sub>2</sub> DOD CHD <sub>2</sub> OD	Methyl alcohol (isotopes)	H. Test	Well underway
CH <sub>2</sub> DSH CHD <sub>2</sub> SH	Methyl mercaptan (isotopes)	H. Test P. Seibt	Well underway
C <sub>6</sub> H <sub>5</sub> CFO	Benzoyl Fluoride	R. Kakar	Ground state and seven excited torsional states + two other vibrational modes + 2nd excited state for one of the other modes assigned.
N <sub>3</sub> OCOCH <sub>3</sub> N <sub>3</sub> OCOCD <sub>3</sub>	Methyl Azido Formate	R. Kakar	Ground state lines of the normal molecule have been assigned.
CH <sub>2</sub> DCH <sub>2</sub> OH	Ethyl alcohol (isotope)	R. Kakar	D in plane and D out of plane have been assigned for OH trans species.

49a. Texas Woman's University  
 Department of Chemistry  
 Denton, Texas 76204  
 Dr. Lewis C. Sams

F <sub>3</sub> ISI (SiF <sub>3</sub> I)	Iodotrifluorosilane	Y. H. Yoon	Spectrum assigned
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0. Name of Institution Tokyo Institute of Technology  
 Name of Department or Institute Laboratory of Molecular Spectroscopy  
 Name to Whom Queries Should Be Addressed Kunio Kojima

$C_4H_6O$ ( $H_2C=C(CH_3)-CHO$ )	Methacrolein	H. Suzuki	Paper received by J. Mol. Spectrosc.
$C_4H_5N$ ( $H_2C=C(CH_3)-CN$ )	Methacrylonitrile	M. Suzuki	Manuscript in preparation
$C_6H_7N$ ( $C_6H_5NH_2$ )	Aniline	A. Hata	Manuscript in preparation
$C_5H_6O$ ( $CH=CH-C(CH_3)=CH-O$ )	3-Methylfuran	T. Ogata	Manuscript in preparation
$C_5H_6S$ ( $CH=CH-C(CH_3)=CH-S$ )	3-Methylthiophene	T. Ogata	Manuscript in preparation
$C_4H_4S$ ( $CH=CH-CH=CH-S$ )	Thiophene	T. Ogata	Dipole moment, Manuscript for Note in preparation
$C_6H_5NO$ ( $CH=CH-CH=CH-C(CHO)=N$ )	2-Pyridine aldehyde	Y. Kawashima	Trans isomer assigned
$C_3H_5NO_2$ ( $H_2C=C(CH_3)-NO_2$ )	2-Nitropropylene	K. Tochigi	Spectrum assigned

Name of Institution TOYAMA UNIVERSITY  
 Name of Department or Institute PHYSICS DEPARTMENT  
 Name to Whom Queries Should Be Addressed TAKESHI KOJIMA

$CH_5N$ ( $CH_3NH_2$ )	Methyl amine	K. Takagi T. Kojima	Manuscript in preparation
$NOH_3$ ( $NH_2OH$ )	Hydroxylamine	S. Tsunekawa	Manuscript in preparation.

Name of Institution University of Göttingen  
 Name of Department or Institute Lehrstuhl Physikalische Chemie +)  
 Name to Whom Queries Should Be Addressed Professor Dr. Werner Zeil

$(\text{CH}_3)_2\text{SiHCl}$	Dimethylchlorosilane	Heinz Jetter, Richard Gegenheimer Werner Zeil	Manuscript prepared
$\text{CH}_3\text{CH}_2\text{SiH}_2\text{Cl}$	Ethylchlorosilane	Volker Typke Richard Gegenheimer Werner Zeil	Spectra of both conformers assigned
$\text{CD}_3\text{SiH}_2\text{Cl}$	Methylchlorosilane	Saskia Pferrer Richard Gegenheimer Werner Zeil	centrifugal distortion constants determined
$\text{CH}_2\text{Cl}-\text{C}=\text{C}-\text{CClH}_2$	1-chloro-4-chloro-propin-2	Horst Günther, Richard Gegenheimer Werner Zeil	work in progress
$\text{C S F Cl}$	Thiocarbonyl-chloro-fluorid	Hans Kohnmann Richard Gegenheimer Werner Zeil	work in progress

+ Present Address: Hertzstr. 16 Bau 35, D 75 KARLSRUHE 21 (Germany)

*W. Zeil*

53. Name of Institution Virginia Polytechnic Institute and State University  
 Name of Department or Institute Chemistry  
 Name to Whom Queries Should Be Addressed Jack D. Graybeal

$\text{C}_2\text{H}_2\text{BrN}$  ( $\text{CH}_2\text{ErCN}$ ) Bromoacetonitrile

$^{79}\text{Er}$  and  $^{81}\text{Er}$  species assigned.

54. UNIVERSITY OF WISCONSIN  
 Department of Chemistry  
 Madison, Wisconsin  
 C. D. Cornwell

$\text{F}_5\text{I}$  ( $\text{IF}_5$ )

Iodine pentafluoride

J. Grow

In Progress.

FORMULA INDEX

Ag Br Silver Bromide - 10	$\text{CH}_2\text{Br}_2$ Methylene bromide - 22
Ag Cl Silver-Chloride - 10	$\text{CH}_2\text{N}_2$ ( $\text{CD}_2\text{N}_2$ ) Dideutero-cyanamide - 11
AgI Silver-iodide - 10	$\text{CH}_2\text{N}_4$ ( $\text{CH}=\text{N}=\text{N}=\text{N}-\text{NH}$ ) Tetrazole - 36
AlF Aluminumfluoride - 10	$\text{CH}_2\text{O}$ ( $\text{H}_2\text{CO}$ ) Formaldehyde - 21
AsF <sub>3</sub> Arsenic Trifluoride - 19	$\text{C H}_2\text{O}_2$ ( $\text{H COOH}$ ) Formic Acid - 21
$\text{BClF}_2\text{H}_3\text{F}$ ( $\text{F}_2\text{ClF}-\text{BH}_3$ ) Chlorodifluoro-phosphine-borane - 26	$\text{CH}_2\text{S}$ ( $\text{H}_2\text{CS}$ ) Thioformaldehyde - 31
BF Boron Fluoride - 31	$\text{CH}_3\text{ClS}$ ( $\text{CH}_3\text{SCL}$ ) Methylsulfenyl chloride - 17
Ba O Barium-oxide - 10	$\text{CH}_3\text{F}$ Methyl fluoride - 19
$\text{BrH}_3\text{Sn}$ ( $\text{SnH}_3\text{Br}$ ) Bromo-stannane - 25	$\text{CH}_3\text{FO}_2\text{S}$ ( $\text{CH}_3\text{FSO}_2$ ) Methyl Sulfonyl-fluoride - 31
BrO Bromine monoxide - 19	$\text{CH}_3\text{F}_2\text{OP}$ ( $\text{CH}_3\text{OPF}_2$ ) Methoxydifluoro-phosphine - 27
$\text{C Cl F S}$ ( $\text{C S F Cl}$ ) Thiocarbonyl-chloro-fluoride - 52	$\text{CH}_3\text{F}_2\text{P}$ ( $\text{CH}_3\text{PF}_2$ ) Methyl difluoro-phosphine - 27
$\text{CF}_2$ Carbon Difluoride - 31	$\text{CH}_3\text{GeN}$ ( $\text{GeH}_3\text{CN}$ ) Germyl Cyanide - 46
$\text{CF}_2\text{NP}$ ( $\text{PF}_2\text{CN}$ ) Cyanodifluoro-phosphine - 27	$\text{CH}_3\text{NO}$ Nitrosomethane - 4
$\text{CF}_2\text{N}_2$ ( $\text{NF}_2\text{CN}$ ) Difluorocyanamide - 11, 27	$\text{CH}_3\text{NO}_2$ Nitromethane - 4
$\text{CF}_4\text{O}$ ( $\text{CF}_3\text{OF}$ ) Trifluoromethyl hypo-fluorite - 20	$\text{CH}_3\text{NO}_3$ Methyl nitrate - 4
$\text{CF}_6\text{Si}$ ( $\text{CF}_3\text{SiF}_3$ ) Hexafluoro methyl silane - 31	$\text{CH}_3\text{NS}$ ( $\text{CHSNH}_2$ ) Thioformamide - 19
CHN (HCN) Hydrogen Cyanide - 31	$\text{CH}_4\text{O}$ ( $\text{CH}_3\text{OH}$ ) Methyl alcohol - 32
CHNO (HCNO) Fulminic Acid - 18	$\text{CH}_4\text{O}$ Methyl alcohol (isotopes) - 49
CHNO (DCNO) Deutero Fulminic Acid - 18	$\text{CH}_4\text{S}$ Methyl mercaptan (isotopes) - 49
	$\text{CH}_5\text{As}$ ( $\text{CH}_3\text{AsH}_2$ ) Methylarsine - 36

$\text{CH}_5\text{ClSi} (\text{CD}_3\text{SiH}_2\text{Cl})$	Methylchloro- silane - 52	$\text{C}_2\text{H}_2\text{N}_2\text{S}$	2,4-Thiadiazole - 34
$\text{CH}_5\text{FGe} [\text{CH}_3\text{GeH}_2\text{F}]$	Methyl Germyl Fluoride - 33	$\text{C}_2\text{H}_2\text{N}_2\text{Se}$	Selenadiazole - 29
$\text{CH}_5\text{FGe} [\text{CD}_3\text{GeH}_2\text{F}]$	Deutro Methyl Germyl Fluoride - 33	$\text{C}_2\text{H}_3\text{Br} [\text{CH}_2 = \text{CHBr}]$	Vinyl Bromide - 23
$\text{CH}_5\text{N}(\text{CH}_3\text{NH})$	Methyl amine - 51	$\text{C}_2\text{H}_3\text{Br}_3 [\text{CH}_3\text{CBr}_3]$	Methylbromo- form - 44
$\text{CH}_5\text{NO}(\text{CH}_3\text{-O-NH}_2)$	Methoxyamine - 16	$\text{C}_2\text{H}_3\text{F}_3\text{Si}(\text{SiF}_3\text{CH}=\text{CH}_2)$	Vinyl trifluoro- silane - 40
$\text{CH}_6\text{N}_2(\text{NH}_2\text{-NHCH}_3)$	Methyl hydrazine - 16	$\text{C}_2\text{H}_3\text{F}_3\text{Si} [\text{H}_2\text{CCHSiF}_3]$	Trifluoro- vinyl- silane - 44
$\text{CH}_6\text{OSi}(\text{CH}_3\text{OSiH}_3)$	silyl methyl ether - 40	$\text{C}_2\text{H}_3\text{N}(\text{CH}_3\text{NC})$	Methyl isocyanide - 21
$\text{CH}_6\text{Si} (\text{CH}_3\text{SiH}_3)$	Methyl silane - 19	$\text{C}_2\text{H}_3\text{NO}$	Glycolnitrile - 3
$\text{CH}_7\text{B}_5$	Carbahexaborane(7) - 45	$\text{C}_2\text{H}_3\text{NO}_2(\text{CH}_2=\text{CHNO}_2)$	Nitroethylene - 41
$\text{CH}_8\text{BP}(\text{H}_3\text{BPH}_2\text{CH}_3)$	Methyl phosphine borane - 26	$\text{C}_2\text{H}_3\text{NS} (\text{CH}_3\text{SCN})$	Methylthio- cyanate - 17
$\text{CNO} (\text{NCO})$	- 19	$\text{C}_2\text{H}_3\text{NS} (\text{CD}_3\text{SCN})$	$d_3$ -methylthio- cyanate - 9
$\text{CN}_4$	$\text{NC}\cdot\text{N}_3$ Cyanogen azide - 29,46	$\text{C}_2\text{H}_3\text{N}_3$	1,2,4-triazole - 29
$\text{COCl}_2$	Carbonyl Chloride - 3	$\text{C}_2\text{H}_3\text{N}_3\text{O}_2$	Methyl azido formate (isotopes) - 49
$\text{COS} (\text{OCS})$	Carbonyl sulfide - 31	$\text{C}_2\text{H}_4\text{ClF} (\text{CH}_3\text{CHFCl})$	1-1 Chloro- fluoroethane - 7
$\text{C}_2\text{F}_2\text{O}_2 [\text{COF}]_2$	Oxalyl fluoride - 44	$\text{C}_2\text{H}_4\text{Cl}_2$	1:2-Dichloroethane - 12
$\text{C}_2\text{HBF}_2 (\text{HC}=\text{CBF}_2)$	Ethynyl difluoro borane - 31	$\text{C}_2\text{H}_4\text{F}_2$	1,2-difluoroethane - 5
$\text{C}_2\text{H}_3\text{F}_3$	Trifluoroethylene - 32	$\text{C}_2\text{H}_4\text{F}_3\text{N}(\text{CF}_3\text{CH}_2\text{NH}_2)$	Trifluoroethyl- amine - 13
$\text{C}_2\text{H}_2\text{BrN}(\text{CH}_2\text{BrCN})$	Bromoaceto- nitrile - 53	$\text{C}_2\text{H}_4\text{O}$	Acetaldehyde - 37
$\text{C}_2\text{H}_2\text{F}_2\text{O}(\text{CHF}_2\text{COH})$	difluoroacetal- dehyde - 6	$\text{C}_2\text{H}_4\text{O}_2$	Acetic acid - 25 (isotope)
$\text{C}_2\text{H}_2\text{N}_2\text{O}$	2,4-Oxadiazole - 34		

$C_2H_4O_3$ ( $CH_3COOOH$ ) peroxyacetic acid - 6	$C_2H_7ClSi$ ( $CH_3CH_2SiH_2Cl$ ) Ethylchloro- silane - 52
$C_2H_4O_3$ 1,2,4 trioxacyclopentane - 26	$C_2H_7NO$ ( $CH_2OHCH_2NH_2$ ) 2-Amino- ethanol - 40
$C_2H_5N$ Ethyleneamine(aziridine) - 8	$C_3BrN$ ( $BrCCCN$ ) Bromocyano- acetylene - 35
$C_2H_5NO_3$ Ethyl nitrate - 13	$C_3ClF_3$ ( $CF_3CCl$ ) Trifluoromethyl- chloro- acetylene - 35
$C_2H_5NO_3$ ( $HOCH_2CH_2NO_2$ ) 2-Nitro- ethanol - 13	$C_3ClN$ ( $ClCCCN$ ) Chlorocyano- acetylene - 35
$C_2H_6$ ( $CH_3CD_3$ ) Ethane - 19	$C_3F_4$ Perfluoro propyne - 34
$C_2H_6F_2NP$ ( $(CH_3)_2N-PF_2$ ) Dimethylamino- difluoro- phosphine - 3	$C_3F_6$ ( $CF_2=CFCF_3$ ) Hexafluoro- propene - 31
$C_2H_6N_2O$ ( $(CH_3)_2NNO$ ) Dimethylnitros- amine - 17	$C_3H_2O$ cyclopropenone - 15
$C_2H_6O$ [ $CH_3OCD_3$ ] Dimethylether - 44	$C_3H_2O_3$ ( $O-CH=CH-O-C=O$ ) Vinylene carbonate 48
$C_2H_6O$ [ $CH_3CH_3OH$ ] Ethyl Alcohol - 23	$C_3H_3Br$ ( $CH_2=C=CHBr$ ) Bromoallene - 30
$C_2H_6O$ ( $CH_2DCH_2OH$ ) Ethyl Alcohol (isotope) - 49	$C_3H_3Cl$ ( $CH_2=C=CHCl$ ) Chloroallene - 30
$C_2H_6O_2$ ( $HOCH_2-CH_2OH$ ) Ethylene- glycol - 35,48	$C_3H_3ClO$ ( $CH_2=CH-COCl$ ) Acryloyl chloride - 40
$C_2H_6O_2S$ ( $(CH_3)_2SO_2$ ) Dimethyl- sulfone - 41, 31	$C_3H_3F$ ( $CH_2=C=CHF$ ) Fluoroallene - 30
$C_2H_6S$ ( $(CD_3)_2S$ ) $d_6$ -dimethyl sulfide - 9, 17	$C_3H_3F_3$ ( $CF_3CH=CH_2$ ) 3,3,3-trifluoro- propene - 41
$C_2H_6S_2$ ( $CH_3SSCD_3$ ) Dimethyldi- sulfide- $d_3$ - 17	$C_3H_4$ Methylacetylene - 39
$C_2H_7As$ ( $(CH_3)_2AsH$ ) Dimethylarsine - 36	$C_3H_4ClN$ ( $ClCH_2CH_2CN$ ) 3-Chloropropio- nitrile - 13
$C_2H_7B_3$ Dicarbapentaborane(7) - 45	$C_3H_4N_2$ Imidazole - 29,34
$C_2H_7ClSi$ ( $(CH_3)_2SiHCl$ ) Dimethyl- chloro- silane - 52	$C_3H_4N_2$ ( $1,2-N^{15}C_3H_4N^{14}$ ) pyrazole - 2 ( $3,4,5-D_3CHN_2^{14}$ ) ( $3,4-D_2C_3H_2N_2^{14}$ )

$C_3H_4N_2$	pyrazole - 2, 8, 22	$C_3H_7N$ ( $C_3H_5NH_2$ )	Cyclopropyl- amine - 16
$C_3H_4O$	Propargylalcohol - 3	$C_3H_7N$ ( $CH_3CH=NCH_3$ )	N-Methylethyl- idenimine - 47
$C_3H_4O_2$ ( $CH_2OCHCHO$ )	Glycidaldehyde - 27	$C_3H_7NO$ ( $HCON(CH_3)_2$ )	Dimethyl- formamide - 27, 42
$C_3H_4S$	Propargyl mercaptan - 34	$C_3H_8O_2$ ( $CH_3OCH_2CH_2OH$ )	2-methoxy- ethanol - 20
$C_3H_5FO$	Propionyl fluoride - 34	$C_3H_8S$	Isopropyl mercaptan - 34, 48
$C_3H_5I$ ( $CH_2=ClCH_3$ )	2-Iodopropene - 47	$C_3H_8Si$ ( $CH_2CH_2CH_2SiH_2$ )	Silacyclo- butane - 31
$C_3H_5N$ ( $CH_3CH_2CN$ )	Ethylcyanide - 17	$C_3H_9ClSi$ [ $(CH_3)_3SiCl$ ]	Trimethyl chlorosilane - 44
$C_3H_5NO_2$ ( $CH_2-CH_2-CH-NO_2$ )	Nitrocyclo- propane - 48	$C_3H_9N$ ( $(CH_3)_2CHNH_2$ )	Isopropyl- amine - 48
$C_3H_5NO_2$ ( $H_2C=C(CH_3)-NO_2$ )	2-Nitropro- pylene - 50	$C_3H_9P$ ( $P(CH_3)_3$ )	Trimethylphos- phine - 26
$C_3H_5NS$ ( $CH_3CH_2SCN$ )	Ethylthio- cyanate - 35	$C_3H_{12}BP$ ( $H_3B-P(CH_3)_3$ )	Trimethyl- phosphine borane - 26
$C_3H_6N_2$ ( $(CH_3)_2NCN$ )	Dimethylcyan- amide - 11	$C_3IN$ ( $ICCCN$ )	Iodocyanoacetylene - 35
$C_3H_6O$	Cyclopropanol - 34	$C_3O_2$ ( $C-C-O-C-O$ )	dioxolane - 6
$C_3H_6O$	Propanal (Propionaldehyde) - 13	$C_3O_2$ ( $C-O-C-C=O$ )	oxetanone - 6
$C_3H_6O_2$ ( $C_2H_3O-CH_2OH$ )	Glycidol - 32	$C_4H_3N$ ( $CH_2=C=CHCN$ )	Cyanoallene - 30
$C_3H_6O_2$	Propionic Acid - 34	$C_4H_3NO_2$	Maleimide - 11
$C_3H_6O_3$	Dimethyl carbonate - 34	$C_4H_4Cl_2$ ( $CH_2ClCCCH_2Cl$ )	1,4-dichloro- 2-butyne - 52
$C_3H_6O_3$ ( $H_2CO$ ) <sub>3</sub>	Trioxane - 21	$C_4H_4N_2$	Pyrimidine - 29
$C_3H_7B_3$	Tricarbapentaborane(7) - 45	$C_4H_4O$ ( $O-CH_2-CH-C\equiv CH$ )	Epoxy butyne - 48
$C_3H_7FSi$ [ $(CH_3)_3SiF$ ]	Trimethylfluoro- silane - 44		
$C_3H_7N$ ( $CH_2CHCH_2NH_2$ )	allylamine - 9, 30		

- $C_4H_4O$  methylcyclopropeneone - 15  
 $C_4H_4O_2$  (O-CH<sub>2</sub>-CH=CH-CO) lactone - 22  
 $C_4H_4S$  (CH=CH-CH=CH-S) Thiophene - 50  
 $C_4H_5FO$  Epifluorohydrin - 32  
 $C_4H_5N$  (CH<sub>2</sub>-CH<sub>2</sub>-CH-CN) Cyclopropyl-  
cyanide - 48  
 $C_4H_5N$  (H<sub>2</sub>C=C(CH<sub>3</sub>)-CN) Methacrylo-  
nitrile - 50  
 $C_4H_5N$  Methylacrylonitrile - 15  
 $C_4H_5NO$  5-Methyl isoxazole - 34  
 $C_4H_5NS$  (CH<sub>2</sub>=CHCH<sub>2</sub>NCS) Allyl isothio-  
cyanate (allyl  
mustard oil) - 30  
 $C_4H_5NS$  3-Methyl thiazole - 34  
 $C_4H_6O$  O-CH=CH-CH<sub>2</sub>-CH<sub>2</sub> 2,3-Dihydro-  
furan - 44  
 $C_4H_6O$  (CH<sub>2</sub>=CH-O-CH=CH<sub>2</sub>) Divinyl ether - 40  
 $C_4H_6O$  (H<sub>2</sub>C=C(CH<sub>3</sub>)-CHO) Methacrolein - 50  
 $C_4H_6O_2$  (O=C-O-CH(CH<sub>3</sub>)-CH<sub>2</sub>) Beta-butyro-  
lactone - 43  
 $C_4H_6O_2$  (CH<sub>2</sub>-(CH<sub>2</sub>)<sub>2</sub>-O-CO) γ-butyro-  
lactone - 22  
 $C_4H_6O_2$  Cyclopropane carboxylic  
acid - 34  
 $C_4H_6O_2$  3,6 dioxabicyclo [3.1.0]  
hexane - 39  
 $C_4H_7FO$  Isobutyryl fluoride - 34  
 $C_4H_7N$  (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>NC) n-Propyl isoni-  
trile - 13  
 $C_4H_7NO$  (CH<sub>2</sub>-(CH<sub>2</sub>)<sub>2</sub>-NH-CO) pyrroli-  
done - 22  
 $C_4H_8O$  (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CHO) n-butyralde-  
hyde - 27  
 $C_4H_8O$  (CH<sub>2</sub>-CH<sub>2</sub>-CH-O-CH<sub>3</sub>) Cyclo-  
propyl methyl ether - 48  
 $C_4H_8O$  Ethyl vinyl ether - 34  
 $C_4H_8O$  Isobutyraldehyde - 34  
 $C_4H_8O_2$  1,3-Dioxane - 38  
 $C_4H_9N$  (C<sub>4</sub>H<sub>7</sub>-NH<sub>2</sub>) Cyclobutylamine -16  
 $C_4H_{10}Si$  (CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>SiH<sub>2</sub>) Sila-  
cyclopentane - 31  
 $C_5H_4ClN$  3-chloropyridine - 42  
 $C_5H_4FN$  (C<sub>5</sub>H<sub>4</sub>NF) 2-fluoro-  
pyridine - 17  
 $C_5H_4O_2$  2-cyclopentene-1,4-dione -15  
 $C_5H_4O_3$  Citraconic anhydride - 25  
 $C_5H_5In$  Cyclopentadienyl indium - 4  
 $C_5H_5NNiO$  Cyclopentadienyl nitrosyl  
nickel - 4  
 $C_5H_5NOPt$  Cyclopentadienyl nitrosyl  
platinum - 4  
 $C_5H_5Tl$  Cyclopentadienyl  
thallium - 4  
 $C_5H_5NO$  Pyridine N-oxide - 29  
 $C_5H_6$  (CH<sub>2</sub>-CH<sub>2</sub>-CH-C≡CH) Cyclopropyl-  
acetylene - 48

$C_5H_6O$  ( $\underline{CH_2-CH_2-CH=CH-CO}$ ) cyclopent-  
2-en-1-one - 22

$C_5H_6O$  ( $\underline{CH_2-CH=CH-CH_2-CO}$ ) Cyclopent-  
3-en-1-one - 22

$C_5H_6O$  3-cyclopentenone - 15

$C_5H_6O$  ( $CH=CH-C(CH_3)=CH-O$ ) 3-methyl-  
furan - 50

$C_5H_6N_2$  2-aminopyridine - 39

$C_5H_6S$  3-methylthiophen - 2

$C_5H_6S$  ( $\underline{CH=CH-C(CH_3)=CH-S}$ ) 3-Methylthio-  
phene - 50

$C_5H_6Se$  2-Methylselenophen - 2

$C_5H_8$  Bicyclo[2.1.0]pentane - 16

$C_5H_8$  ( $(CH_3)_2CCCH_2$ ) Dimethylallene - 9

$C_5H_8$  ( $(CH_3)_2CH-C=CH$ ) Isopropylacetyl-  
ene - 48

$C_5H_8$  [ $CH_2=CHCH_2CH=CH_2$ ] 1,4-Penta-  
diene

$C_5H_8$  ( $CH_3CH_2CH_2CCH$ ) 1-Pentyne - 13

$C_5H_8$  ( $\underline{CH_2CH_2CHCH_2}$ ) Vinylcyclopro-  
pane - 27

$C_5H_8$  ( $\underline{CH_2CH_2CHCOCH_3}$ ) Cyclopropyl  
Methyl Ketone - 27

$C_5H_9NO$  ( $(CH_3)_3C-CNO$ ) Pivalonitrile-  
N-oxide - 28

$C_5H_{10}Cl_2$  2,4-Dichloropentane - 14

$C_5H_{10}O$  ( $(CH_3)_3C-CHO$ ) Pivaldehyde - 28

$C_5H_{11}Br$  1-bromo-3-methylbutane - 14

$C_5H_{11}Cl$  1-chloro-3-methylbutane - 1

$C_6H_3F_3$  1,2,4 Trifluorobenzene - 32

$C_6H_4BrF$  ( $o-C_6H_4FBr$ ) ortho-fluoro-  
chloro benzene - 1

$C_6H_4ClF$  ( $m-C_6H_4FCl$ ) meta-fluoro-  
chloro benzene - 1

$C_6H_4O_2$  2-pyrone - 15

$C_6H_5BrO$  4-bromophenol - 8

$C_6H_5ClO$  4-chlorophenol - 8

$C_6H_5FO$  4-fluorophenol - 8

$C_6H_5I$  Benzene Iodide - 3

$C_6H_5NO$  ( $\underline{CH=CH-CH=CH-C(CHO)=N}$ )  
2-Pyridine aldehyde - 50

$C_6H_5NO_2$  Nitrobenzene - 8

$C_6H_5NO_3$  o-Nitrophenol - 40

$C_6H_6$  Dimethylenecyclobutene - 29

$C_6H_6$  Fulvene - 29

$C_6H_6ClN$  ( $ClC_6H_4NH_2$ ) p-Chloroaniline  
- 11

$C_6H_6O$  Phenol - 8, 47

$C_6H_7N$  ( $C_6H_5NH_2$ ) Aniline - 50

$C_6H_8O$  Bicyclo(2.1.1)hexan-2-one - 4

$C_6H_{11}Cl$  Cyclohexyl Chloride - 3

$C_7H_5FO$  ( $C_6H_5CFO$ ) Benzoyl Fluoride  
- 49

$C_7H_6F_2$  ( $CH_3C_6H_4F_2$ ) Difluoro-  
toluene - 9



$C_7H_6O$ Tropone - 39	$ClF_5Te$ Tellurium Chloride pentafluoride - 22
$C_7H_6O_2$ 6-Hydroxy-2-formyl-fulvene - 13	$Cl Ga (Ga Cl)$ Gallium-chloride - 10
$C_7H_6O_2$ Tropolone - 39,13	$ClHO (HOCl)$ Hypochlorous acid - 3, 22
$C_7H_7$ Bicycloheptatriene - 15	$ClH_2N (NH_2Cl)$ Monochloroamine - 3
$C_7H_7FO$ p-Fluoroanisole - 34	$ClH_2N (NH_2Cl)$ Chloroamine - 22
$C_7H_8$ Bicyclo[2.2.1]heptadiene - 15	$ClH_3Sn (SnH_3Cl)$ Chloro-stannane - 25
$C_7H_8 (CD_3C_6H_5; CH_3C_6H_4D)$ toluene - 9	$ClNS (NSCl)$ Thionitrosyl chloride - 17,19
$C_7H_8 (CH_2DC_6H_5)$ toluene - 9	$Cl_2OS (SO Cl_2)$ Thionyl Chloride - 21
$C_7H_9Cl$ 4-Chloronortricyclene - 37	$Cl_2O_2S (SO_2Cl_2)$ Sulfuryl chloride - 21
$C_7H_{13}N$ Quinuclidine - 19	$Cl_2S_2 (S_2Cl_2)$ Sulphur monochloride - 29
$C_8H_7N (CH_3C_6H_4CN)$ p-Cyanotoluene - 9	$CrF_4$ Chromium(IV)fluoride - 29
$C_8H_9F ((CH_3)_2C_6H_3F)$ Dimethylfluorobenzene - 9	$CsI$ Cesium-iodide - 10
$C_8H_{10} ((CH_3)_2C_6H_4)$ ortho-Xylene - 9	$FH_3Si (SiH_3F)$ Fluorosilane - 37
$C_8H_{11}N$ 2-Norbornanecarbonitrile - 14	$FH_3Sn (SnH_3F)$ Fluoro-stannane - 25
$C_8H_{13}Cl$ 1-Chlorobicyclo[2.2.2]octane - 19	$F In (In F)$ Indiumfluoride - 10
$C_8H_{13}F$ 1-Fluorobicyclo[2.2.2]octane - 19	$FNO (NOF)$ Nitrosyl fluoride - 17
$C_{10}H_8$ Azulene - 47	$F Tl (Tl F)$ Thallium fluoride - 10
$C_{10}H_{10}$ Bullvalene - 37	$F_2Ge$ Germanium difluoride - 40
$C_{11}H_{15}N (C_{10}H_{15}CN)$ Adamantyl cyanide - 22	$F_2H_2NP (PF_2NH_2)$ Aminodifluorophosphine - 27
$C_{12}H_{12}Ti (C_5H_5TiC_7H_7)$ Cycloheptatrienyl titanium cyclopentadienide - 4	$F_2H_2P_2 (H_2PPF_2)$ Phosphino difluorophosphine - 26
$ClF_2P (PF_2Cl)$ Chlorodifluorophosphine - 27	$F_2N (NF_2)$ Nitrogen(II)fluoride - 29