

HARVARD UNIVERSITY

Department of Chemistry

12 Oxford Street
Cambridge 38, Massachusetts

February 28, 1962

Dear Contributor:

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

1--AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

Department of Chemistry
(Albert W. Jache)

SiF_3I	iodotrifluorosilicon IV	A. W. Jache and L. C. Sams	manuscript in preparation
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2--UNIVERSITY OF BIRMINGHAM

Department of Chemistry
(John Sheridan)

$\text{FCH}_2\text{C}\equiv\text{CH}$	propargyl fluoride (3-fluoropropyne)	B. E. Job	A, B, C measured: preliminary note sent for publication
FH_3Si	fluorosilane	A. C. Turner	B values being re- measured: D_{JK} eval- uated.
FH_2DSi	fluorosilane-d	A. C. Turner	B and C evaluated
H_2NNO_2	nitramide	J. K. Tyler	started here, being continued at the Nat'l Research Council

3--UNIVERSITY OF CALIFORNIA

Department of Chemistry
(W. D. Gwinn, R. J. Myers and J. A. Howe)

$\text{C}_3\text{H}_4\text{Cl}_2$	1,1-dichlorocyclopropane		to be published in January 1962, J.C.P.
SF_4	sulfur tetrafluoride		to be published in March 1962, J.C.P.
CH_2Cl_2	methylene chloride		to be published in March 1962, J.C.P.

* Present address: Research Department
Ozark-Mahoning Company
310 West 6th Street, Tulsa, Oklahoma

(continued UNIVERSITY OF CALIFORNIA)

CH_2O_2	formic acid	measured revised dipole moment value.
$\text{C}_2\text{H}_4\text{Cl}_2$	1,1-dichlorethane	assignment, including quadrupole coupling.
$\text{C}_2\text{H}_5\text{N}$	ethyleneimine	measured quadrupole coupling.
$\text{C}_3\text{H}_6\text{S}$	trimethylene sulfide	assignment, including excited states.
C_4H_6	cyclobutene	assignment, Q-branch.
CF_3NO_2	trifluoronitromethane	work in progress.
CH_3NO_2	methyl nitrite	work in progress.
$\text{C}_4\text{H}_8\text{O}$	tetrahydrofuran	work in progress.
$\text{C}_2\text{H}_6\text{O}$	dimethyl ether	paper in progress.
CH_3SF_5	methyl sulfurpentafluoride	paper in progress.
IF_5	iodine pentafluoride	assignment, symmetric top.
$\text{C}_2\text{H}_2\text{Cl}_2$	1,1-dichloroethylene	Stark effect, to be published in Feb. 1962, J.C.P.
CCl_2O	phosgene	Stark effect, to be published in Feb. 1962, J.C.P.
$\text{C}_2\text{H}_2\text{ClF}$	trans-1-chloro-2-fluoroethylene	work in progress.

4--COLUMBIA UNIVERSITY
Department of Chemistry
(Benjamin P. Dailey)

$\text{C}_6\text{H}_5\text{Cl}$	chlorobenzene	E. Rosenthal	Spectrum largely analyzed.
$\text{C}_6\text{H}_5\text{Br}$	bromobenzene	E. Rosenthal	

5--COLUMBIA UNIVERSITY, Department of Physics
(L. C. Krisher)

CH_3COI	acetyl iodide	in progress
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6--UNIVERSITY OF COPENHAGEN
Department of Chemistry
(Børge Bak)

C_3H_3NS	thiazole	common species assigned. Deuterated and ^{15}N species in stock. Note being prepared.
C_3H_4O	methyl ketene	common species essentially assigned. Note being prepared.
C_4H_4O	furan	^{18}O and 2 ^{13}C -species completed. Manuscript being prepared.
C_4H_4S	thiophene	published
C_6H_5F	fluorobenzene	^{13}C species under preparation.
C_7H_5N	benzonitrile	analysis of 5 species completed. Further ^{13}C ring compound prepared, spectral work in progress.
$C_{10}H_7F$	1-F-naphthalene	suspended, not abandoned.
$C_2H_2N_2S$	1,3,4-thiadiazole	common species assigned.

7--EMORY UNIVERSITY
Department of Physics
(A. K. Garrison and J. W. Simmons)

CD_3Cl	d-methyl chloride	A. K. Garrison	measurements under way on centrifugal distortion
CD_3Br	d-methyl bromide	A. K. Garrison	
CD_3I	d-methyl iodide	J. W. Simmons	measurements completed

8--UNIVERSITY OF FREIBURG
Institute fur Physical Chemistry, Freiburg I.B.R.
(W. Maier)

C_2H_6S	dimethyl sulfide: centrifugal distortion. internal rotation splitting	H. D. Rudolph H. Dreizler and H. D. Rudolph	in press paper in preparation
$C_2H_6S_2$	dimethyl disulfide: rotational spectrum being analysed	H. Dreizler	
$C_2D_6S_2$	being prepared		
$C_3H_{12}BN$	$(H_3B.N(CH_3)_3)$ prepared, spectrum being studied	H. G. Schirdewahn	

9--GEORGIA INSTITUTE OF TECHNOLOGY
 School of Physics
 (Quitman Williams and T. L. Weatherly)

CHClF ₂	chlorodifluoromethane	E. Beeson	rotational constants, quadrupole couplings, dipole moment measured, manuscript in preparation
CHCl ₂ F	dichlorofluoromethane	Q. Williams T. Weatherly	lines observed attempting identification
SCCl ₂	thiophosgene	J. Murray	lines observed, preliminary analysis underway.
NOBr	nitrosyl bromide	E. Eagle	Stark effect of $1_1 \rightarrow 2_0$ completed, manuscript in preparation.

10--HARVARD UNIVERSITY
 Department of Chemistry
 (E. B. Wilson, Jr.)

C ₅ H ₈	cyclopentene	G. Rathjens	in press
F ₂ O ₂		R. Jackson	in press
C ₃ H ₇ F	n-propyl fluoride	E. Hirota	in press
CH ₂ NOH	formaldoxime	I. Levine	in press
CH ₃ CH:CHF	cis-2 fluoropropene	R. Beaudet	in manuscript
CH ₃ CH ₂ CH ₂ CN	n-propyl nitrile	E. Hirota	nearly finished
CH ₂ FCH:CH ₂	fluoropropene	E. Hirota	nearly finished
CH ₂ CO	ketene(intensities)	P. Cox	nearly finished
CH ₃ OC1		J. Rigden	nearly finished
GeH ₃ F		J. Rigden	nearly finished
GeH ₃ Br		J. Rigden	nearly finished
F ₂ CO		R. Jackson	see Stanford Univ.
CH ₃ CH ₂ CHO	propionaldehyde	S. Butcher	nearly finished
CH ₃ GeH ₃	methyl germane	S. Butcher	nearly finished
cis N ₂ F ₂		R. Kuczkowski	in progress
FNS		W. Kirchhoff	in progress
trans CH ₃ CHCHCl		R. Beaudet	in manuscript

11--TECHNISCHE HOCHSCHULE KARLSRUHE
Physikalische Chemie
(Werner Zeil)

$(\text{CH}_3)_3\text{SiCCH}$ trimethyläthynylsilan W. Zeil and W. Plein work in
 $(\text{CH}_3)_3\text{SiCCD}$ trimethyläthynylsilan- d_1 W. Zeil and W. Plein progress

12--UNIVERSITÉ DE LOUVAIN
Centre de Physique Nucléaire et Moléculaire
(M. de Hemptinne)

$\text{C}_2\text{H}_3\text{Br}$ vinyl bromide R. E. Goedertier manuscript prepared
 $\text{C}_2\text{H}_6\text{O}$ ethanol J. Michielsen-Effinger analysis of the
spectrum between
13 and 36 C_μ in course
 $\text{C}_2\text{H}_2\text{F}_2$ vinylidene fluoride J. C. Chauffoureaux new analysis in
course
 O_2S sulphur dioxide R. Van Riet work in progress
F. Greindl

13--MICHIGAN STATE UNIVERSITY
Department of Chemistry
(R. H. Schwendeman)

$\text{CH}_3\text{CH}_2\text{Cl}$ ethyl chloride G. D. Jacobs in press
 $\text{SiH}_3\text{CH}_2\text{Cl}$ chloromethylsilane G. D. Jacobs in press
 $\text{CH}_2\text{CH}_2\text{CHCl}$ cyclopropyl chloride G. D. Jacobs Cl-35, Cl-37 specific
C-type spectra
assigned
 $\text{CH}_3\text{CHClCH}_3$ isopropyl chloride F. Tobiason Cl-35, Cl-37 specific
Deuterated species
prepared.

14--NATIONAL BUREAU OF STANDARDS
Molecular Spectroscopy Section
(David R. Lide, Jr.)

$(\text{CH}_3)_3\text{CCCH}$ t-butyl acetylene L. J. Nugent, in press;
D. E. Mann, J. Chem. Phys.
 $(\text{CH}_3)_3\text{CCN}$ t-butyl cyanide D. R. Lide
 CHCl_3 chloroform M. Jen, D. R. Lide in press, S.C.P.
 $(\text{CH}_3)_3\text{CCl}$ t-butyl chloride M. Jen, D. R. Lide almost complete

(continued NATIONAL BUREAU OF STANDARDS)

$\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$	<u>n</u> -propyl chloride	T. Sarachman	almost complete
$\text{CH}_2:\text{CHCF}:\text{CH}_2$	fluoroprene	D. R. Lide	almost complete
$\text{CH}_2:\text{CHC}(\text{CH}_3):\text{CH}_2$	isoprene	M. Jen, D. R. Lide	spectrum assigned
ClO_3F	perchlorylfluoride	D. R. Lide	spectrum assigned
NF_2	difluoroamine radical	D. R. Lide	work dropped temporarily.

15--NATIONAL RESEARCH COUNCIL

Division of Pure Physics
(C. C. Costain)

$\text{CHF}_3, \text{CDF}_3$	fluoroform excited states	C.C. Costain	manuscript prepared
$\text{HCOOH-NH}_2\text{CHO}$	H-bond studies	W.B. Dixon	No lines found, abandoned
$\text{CF}_3\text{COOH-HCOOH}$			
$\text{CF}_3\text{COOH-CH}_3\text{COOH}$	H-bond studies	G.P. Srivastava	Measurements continuing
$\text{CF}_3\text{COOH-CH}_2\text{FCOOH}$			
CH_2FCOOH	monofluoroacetic acid	G.P. Srivastava	some tentative assignments
H_2NNO_2	nitramide	J.K. Tyler	see Univ. of Birmingham

16--UNIVERSITA' DI PADOVA
Institute of Physical Chemistry
(Paolo G. Favero)

COF^{35}Cl	A. M. Mirri and A. Guarnieri	centrifugal distortion analysis completed
COF^{37}Cl	"	rotation constants obtained structure calculations almost completed.

17--RICE UNIVERSITY
Department of Chemistry
(R. F. Curl, Jr.)

ClO_2	chlorine dioxide	R. F. Curl	work on centrifugal distortion and Stark and Zeeman effects in progress
CH_2NOH	formaldoxime	M. G. Pillai	in press

18--STANFORD UNIVERSITY
Department of Chemistry
(Victor W. Laurie)

F_2CO carbonyl fluoride D. Pence manuscript in preparation
 $(CH_3)_2NH$ dimethylamine J. Wollrab tentative assignment

19--SWISS FEDERAL INSTITUTE OF TECHNOLOGY
Zürich, Switzerland
(Hs. H. Günthard)

$\underline{CH_2-CH_2-CH_2}C=O$ cyclobutanone A. Bauder 4 isotopes ground state
rotational spectrum
analysed manuscript under
way.
 $CH_3 \cdot CI : CH_2$ 2-Iodopropene Hunziker, 6 isotopic species pre-
pared MW-Measurements
started
 $CH_3 \cdot CBr : CH_2$ 2-Bromopropene " 12 Isotopic species
prepared
 $CH_2 \cdot CCl : CH_2$ 2-chloropropene " 14 isotopic species
prepared
 $C_{10}H_8$ azulene H. Tobler 5 isotopic species pre-
pared MW measurements
started

20--UNIVERSITY OF TOKYO
Department of Chemistry
(Yonezo Morino)

H_2CO formaldehyde K. Takagi spectrum in the millimeterwave
region is in progress.
 SO_2 sulphur dioxide Y. Kikuchi manuscript for the excited state
of ν_2 mode is in preparation.
 CD_3CN acetonitrile- d_3 C. Matsumura manuscript for the excited vibration
al states is in preparation.
 $(CH_2O)_3$ trioxane T. Oka paper is in preparation.
 F_2CO carbonyl fluoride S. Saito 80 lines of F_2CO and some of the C^{13}
species have been assigned. Spectrum
in the excited vibrational states
is in progress.

21--UNIVERSITY OF TOKYO
Department of Physics
(Koichi Shimoda)

$\text{NH}_2 \cdot \text{NH}_2$	hydrazine	Takahiro Kasuya Takeshi Kojima	manuscript prepared
NH_3	ammonia	Kunitaka Kondo Koichi Shimoda	analysis in progress
	Zeeman effect by beam maser		
H_2CO	formaldehyde	Katsumi Sakurai Tadao Shimizu Kunitaka Kondo	experimental results obtained
	Zeeman effect by beam maser		

22--WEST VIRGINIA UNIVERSITY
Department of Chemistry
(Jack D. Graybeal)

$\text{CH}_2\text{F-CN}$	fluoroacetonitrile	D.W. Roe J.D. Graybeal	manuscript in preparation
$\text{CH}_2\text{Br-CN}$	bromoacetonitrile	R.Y. Lin and J.D. Graybeal	partial assignment of spectrum made

23--UNIVERSITY OF WISCONSIN
Department of Chemistry
(C. D. Cornwell)

CH_3AsF_2	methyl difluoroarsine	L.J. Nugent	manuscript prepared
CH_3PF_2	methyl difluorophosphine	E.A. Cohen	sample prepared

I appreciate your cooperation and hope this list will prove useful.

Sincerely,



E. Bright Wilson, Jr.

EBW:jm

FORMULA INDEX

(Arrangement as in Townes and Schawlow.
Numbers refer to institution)

BrNO	(NOBr)	- 9	$C_2H_2Cl_2$	(1,1-dichloroethylene)-	3
BrGeH ₃	(GeH ₃ Br)	- 10	C_2H_2FN	(CH ₂ F-CN)	- 22
CClFO	(OCClF)	- 16	$C_2H_2F_2$	(vinylidene fluoride)-	12
CCl ₂ O	(phosgene)	- 3	$C_2H_2N_2S$	(1,3,4-thiadiazole)-	6
CCl ₂ S	(SCCl ₂)	- 9	C_2H_2O	(ketene)	- 10
CF ₂ O	(F ₂ CO)	- 18,20,10	C_2H_3Br	(vinyl bromide)-	12
CF ₃ NO ₂	(trifluoronitromethane)-	3	$C_2H_3FO_2$	(CH ₂ FCOOH)	- 15
CHClF ₂	(chlorodifluoromethane)-	9	C_2H_3IO	(acetyl iodide)-	5
CHCl ₂ F	(dichlorofluoromethane)-	9	C_2D_3N	(acetonitrile-d ₃)-	20
CHCl ₃	(chloroform)-	14	$C_2H_4Cl_2$	(1,1-dichloroethane)-	3
CHF ₃ ,CDF ₃	(fluoroform excited states)	- 15	$C_2H_4O_2$	(H bonds)	- 15
CH ₂ Cl ₂	(methylene chloride)-	3	C_2H_5Cl	(CH ₃ CH ₂ Cl)	- 13
CH ₂ O	(formaldehyde)-	20,21	C_2H_5N	(ethyleneimine)	- 3
CH ₂ O ₂	(formic acid)-	3,15	C_2H_6O	(dimethyl ether)	- 3
CH ₃ AsF ₂	(methyl difluoroarsine)-	23	C_2H_6O	(ethanol)	- 12
CD ₃ Br	(d-methyl bromide)-	7	C_2H_6S	(dimethyl sulfide)	- 8
CD ₃ Cl	(d-methyl chloride)-	7	$C_2H_6S_2$	(dimethyl disulfide)	- 8
CH ₃ ClO	(CH ₃ OCl)	- 10	$C_2D_6S_2$		- 8
CH ₃ F ₂ P	(CH ₃ PF ₃)	- 23	C_2H_7N	$\angle(CH_3)_2NH\angle$	- 18
CD ₃ I	(d-methyl iodide)-	7	C_3H_3F	(FCH ₂ C:CH)	- 2
CH ₃ NO	(NH ₂ CHO)	- 15	C_3H_3NS	(thiazole)	- 6
CH ₃ NO	(formaldoxime)	- 10,17	$C_3H_4Cl_2$	(1,1-dichlorocyclopropane)-	3
CH ₃ NO ₂	(CH ₃ ONO)	- 3	C_3H_4O	(methyl ketene)	- 6
CH ₃ F ₅ S	(methyl sulfurpentafluoride)-	3	C_3H_5Br	(CH ₃ .CBr:CH ₂)	- 19
CH ₅ ClSi	(SiH ₃ CH ₂ Cl)	- 13	C_3H_5Cl	(trans 1-chloropropene)	10
CH ₆ Ge	(methyl germane)	- 10	C_3H_5Cl	(cyclopropyl chloride)	- 13
$C_2HF_3O_2$	(H bonds)	- 15	C_3H_5Cl	(2-chloro-propene)	19
C_2H_2BrN	(CH ₂ Br-CN)	- 22	C_3H_5F	(3-fluoropropene)	- 10
C_2H_2ClF	(trans-1-chloro-2-fluoroethylene)	- 3	C_3H_5F	(cis-1 fluoropropene)	- 10

C_3H_5I ($CH_3 \cdot Cl \cdot CH_2$) - 19	FNS - 10
$C_3H_6O_2$ (trioxane) - 20	F_2N (difluoroamine radical) - 14
C_3H_6S (trimethylene sulfide) - 3	F_2N_2 - 10
C_3H_7Cl ($CH_3CHClCH_3$) - 13	F_2O_2 - 10
C_3H_7Cl ($CH_3CH_2CH_2Cl$) - 14	F_3ISi (iodotrifluorosilicon IV) 1
C_3H_7F (n-propyl fluoride) - 10	F_4S (sulfur tetrafluoride) - 3
C_3H_7O (propionaldehyde) - 10	F_5I (iodine pentafluoride) - 3
$C_3H_{12}BN$ ($H_3B \cdot N(CH_3)_3$) - 8	$H_2N_2O_2$ (H_2NNO_2) - 2, 15
C_4H_4O (furan) - 6	H_3N (ammonia) - 21
C_4H_4S (thiophene) - 6	H_4N_2 (hydrazine) - 21
C_4H_5F ($CH_2:CHCF:CH_2$) - 14	O_2S (sulphur dioxide) - 12, 20
C_4H_6 (cyclobutene) - 3	
C_4H_6O (cyclobutanone) - 19	
C_4H_7N (n-propyl nitrile) - 10	
C_4H_8O (tetrahydrofuran) - 3	
C_4H_9Cl (t-butyl chloride) - 14	
C_5H_8 (cyclopentene) - 10	
C_5H_8 (isoprene) - 14	
C_5H_9N (t-butyl cyanide) - 14	
$C_5H_{10}Si$ $\angle(CH_3)_3SiCCH$ also	
$\angle(CH_3)_3SiCCD$ - 11	
C_6H_5Br (bromobenzene) - 4	
C_6H_5Cl (chlorobenzene) - 4	
C_6H_5F (fluorobenzene) - 6	
C_6H_{10} (t-butyl acetylene) - 14	
C_7H_5N (benzonitrile) - 6	
$C_{10}H_7F$ (1-F-naphthalene) - 6	
$C_{10}H_8$ (azulene) - 19	
ClO_2 (chlorine dioxide) - 17	
ClO_3F (perchloryl fluoride) - 14	
$FGeH_3$ (GeH_3F) - 10	
FH_2DSi (fluorosilane-d) - 2	
FH_3Si (fluorosilane) - 2	