Additions and Corrections

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Dielectric Constant of Liquid Consisting of Anisotropic Molecules

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The following tables are added. (Vol. 31, No. 4, p. 402).

TABLE I

DIELECTRIC CONSTANT OF BENZENE

(Å)		(10^{-25} cc.)
$a_1=7.1$	$a_2/a_1=1.00$	$\alpha_1=123.1$[1]
$a_2=7.1$		$\alpha_2=123.1$
$a_3=3.7$	$a_3/a_1=0.52$	$\alpha_3=63.5$

temp.(°C)	ε(Ob.)[2]	ε(L-L)[3]	ε(Cal.) (0.52)[4]
10	2.302	2.266	2.204
20	2.283	2.244	2.185
30	2.263	2.223	2.165
40	2.243	2.203	2.147
55	2.213	2.170	2.117
65	2.194	2.150	2.099

1) Stuart; loc. cit.
2) Observed values are refered in the following paper. R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).
3) Calculated value with Lorentz-Lorenz formula.
4) Calculated value with our formula assuming as the axial ratio 0.52.

TABLE II

DIELECTRIC CONSTANT OF CARBON DIOXIDE UNDER HIGH PRESSURE

(Å)		(10^{-25} cc.)
$a_1=5.3$	$a_2/a_1=0.52$	$\alpha_1=44.9$[1]
$a_2=3.0$		$\alpha_2=21.4$
$a_3=5.3$	$a_3/a_1=0.52$	$\alpha_3=21.4$

temp.=50°C

d_{amagat}	ε(Ob.)[2]	ε(L-L)	ε(Cal.) (0.6)
24.28	1.02486	1.02433	1.02436
61.20	1.06343	1.06216	1.06202
116.87	1.12444	1.1208	1.1205
231.23	1.25991	1.2487	1.2477
350.40	1.41189	1.3943	1.3898
470.70	1.57801	1.5546	1.5456
549.90	1.69318	1.6684	1.6562
595.89	1.76244	1.7380	1.7232

1) Stuart; loc. cit.
2) Michels and Kleerekoper; Physica, **6**, 586 (1939).

TABLE III

DIELECTRIC CONSTANT OF CARBON DISULFIDE

(Å)			(10^{-25} cc.)
$a_1=6.8$	$a_2/a_1=0.54$		$\alpha_1=151.4$[1]
$a_2=3.7$			$\alpha_2=55.4$
$a_3=3.7$	$a_3/a_1=0.54$		$\alpha_3=55.4$

temp.(°C)	ε(Ob.) (Z.I.)[2]	ε(Ob.) (Fè)[3]	ε(Ob.) (G)[4]	n^2(L.W.)[5]	ε(L-L)	ε(Cal.) (0.5)
40		2.603			2.671	2.545
25		2.625			2.716	2.584
20	2.626	2.632	2.635	2.650	2.732	2.600
15			2.648			
10	2.657	2.644		2.673	2.765	2.625
0	2.688	2.658	2.661	2.699	2.799	2.655
− 20	2.740	2.686	2.739	2.752	2.861	2.708
− 40	2.792		2.794	2.806	2.928	2.762
− 60	2.839		2.850	2.859	2.993	2.819
− 80	2.885		2.904	2.914	3.063	2.876
−100	2.954		2.961	2.969	3.137	2.935
−110	2.988			2.996	3.172	2.966

1) Stuart; loc. cit.
2) A. A. Zuehke and L. R. Ingersoll; *J. Opt. Soc. Amer.*, **27**, 314 (1937).
3) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).
4) M. R. Guillerin; *Compt. rend*, **206**, 1001 (1938).
5) N. Lyon and F. Wolfram; *Ann. d. Physik*, **63**, 739 (1920).

TABLE IV
DIELECTRIC CONSTANT OF CARBON DISULFIDE UNDER HIGH PRESSURE

temp.=30°C

Press.(Atm.)	ε(Ob.)[1]	ε(L-L)	ε(Cal.)(0.5)
1	2.61	2.67	2.56
500	2.74	2.79	2.66
1000	2.82	2.88	2.73
2000	2.94	3.03	2.85
4000	3.11	3.27	3.05
6000	3.23	3.45	3.19
8000	3.33	3.60	3.29
12000	3.52	3.87	3.52

1) W. E. Danforth; *Phys. Rev.*, **38**, 1224 (1931).

TABLE V
DIELECTRIC CONSTANT OF METHYL FLUORIDE UNDER HIGH PRESSURE

(Å)		(10^{-25} cc.)*
$a_1=4.7$	$a_2/a_1=0.85$	$\alpha_1=31.6$[1]
$a_2=4.0$		$\alpha_2=23.2$
$a_3=4.0$	$a_3/a_1=0.85$	$\alpha_3=23.2$

$\mu_0=1.79$ D (Stark effect)[2]

temp.=50°C

Press.(Int. Atm.)	ε(Ob.)[3]	ε(Cal.)(1.7)[4]
21.706	1.218	1.207
29.919	1.333	1.316
41.373	1.551	1.517
49.400	1.783	1.729
55.683	2.067	1.982
60.819	2.496	2.38
63.630	3.001	2.84
65.468	3.811	3.63
66.190	4.210	4.08
67.287	4.726	4.62
69.052	5.214	5.15
71.724	5.659	5.68
74.993	5.992	6.06
81.402	6.422	6.54

1) C. G. Le Fèvre and R. J. W. Le Fèvre; loc. cit.
2) S. N. Ghosh, R. Trambarulo and W. Gordy; *J. Chem. Phys.*, **21**, 308 (1953).
3) H. G. David, S. D. Hamann and J. F. Pearse; *J. Chem. Phys.*, **20**, 969 (1952).
4) Calculated value with our formula assuming as the axial ratio 1.7.
* In the literature of C. G. Le Fèvre and R. J. W. Le Fèvre, the authors assume that $P_E+P_A=9$ cc. and $P_E=6.6$ cc.. However, we assume that $P_A=0$, $P_E=9$ cc.. Using this value we calculate the values of the components of polarizability.

TABLE VI
DIELECTRIC CONSTANT OF METHYL CHLORIDE

(Å)		(10^{-25} cc.)
$a_1=5.6$	$a_2/a_1=0.71$	$\alpha_1=54.2$[1]
$a_2=4.0$		$\alpha_2=41.4$
$a_3=4.0$	$a_3/a_1=0.71$	$\alpha_3=41.4$

$\mu_0=1.87$ D (Stark effect)[2]

temp. (°C)	ε(Ob.)[3] (M.L.)	ε(Ob.) (Fevre)[4]	ε(Cal.) (0.71)	ε(Cal.) (0.75)
−20	12.61	12.6	11.90	12.22
−30	13.26	13.22	12.61	12.91
−40	14.02	14.07	13.38	13.75
−50	14.88	15.00	14.21	14.66
−60	15.84	15.95	15.19	15.64
−70	16.88	16.92	16.23	16.75
−80	18.02		17.44	18.03
−90	19.27		18.76	19.45

1) Stuart; loc. cit.
2) R. G. Shulman, C. H. Towres and B. P. Dailey; *Phys. Rev.*, **78**, 145 (1950).
3) S. C. Morgan and H. H. Lowry; *J. Phys. Chem.*, **34**, 3285 (1930).
4) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

TABLE VII
DIELECTRIC CONSTANT OF METHYL BROMIDE

(Å)		(10^{-25} cc.)
$a_1=5.9$	$a_2/a_1=0.68$	$\alpha_1=68.5$[1]
$a_2=4.0$		$\alpha_2=49.0$
$a_3=4.0$	$a_3/a_1=0.68$	$\alpha_3=49.0$

$\mu_0=1.80$ D (Stark effect)[2]

temp. (°C)	ε(Ob.) (M.L.)[3]	ε(Cal.) (0.68)	ε(Cal.) (0.6)
0	9.97	10.50	9.67
−10	10.42	11.05	10.17
−20	10.91	11.69	10.73
−30	11.43	12.39	11.32
−40	12.00	13.13	11.99
−50	12.63	13.95	12.73
−60	13.32	14.85	13.50
−70	14.07	15.86	14.39
−80	14.96	16.96	15.35
−90	16.02	18.18	16.41
−100	17.4	19.61	17.66

1) Stuart; loc. cit.
2) R. G. Schulman, C. H. Townes and B. P. Dailey; *Phys. Rev.*, **78**, 145 (1950).
3) S. O. Morgan and H. H. Lowry; *J. Phys. Chem.*, **34**, 3285 (1930).

TABLE VIII
DIELECTRIC CONSTANT OF METHYL IODIDE

(Å)		(10^{-25} c.c.)
$a_1=6.3$	$a_2/a_1=0.64$	$\alpha_1=87.2$[1]
$a_2=4.0$		$\alpha_2=65.7$
$a_3=4.0$	$a_3/a_1=0.64$	$\alpha_3=65.7$

$\mu_0=1.65$ D (Stark effect)[2]

temp. (°C)	ε(Ob.) (M.L.)[3]	ε(Cal.) (0.60)	ε(Cal.) (0.45)
40	6.50	7.33	6.35

30	6.75	7.65	6.60
20	7.00	8.00	6.86
10	7.26	8.36	7.14
0	7.53	8.76	7.45
−10	7.81	9.17	7.77
−20	8.13	9.64	8.12
−30	8.48	10.14	8.50
−40	8.87	10.68	8.91
−50	9.28	11.29	9.37
−60	9.74	11.91	9.85
−70	10.33	12.63	10.39

1) Le Fèvre; loc. cit.
2) R. G. Shulman, C. H. Townes and B. P. Dailey; *Phys. Rev.*, **78**, 145 (1950).
3) S. O. Morgan and H. H. Lowry; *J. Phys. Chem.*, **34**, 3285 (1930).

TABLE IX

DIELECTRIC CONSTANT OF ACETONITRILE

(Å)		(10⁻²⁵ cc.)
$a_1=6.2$	$a_2/a_1=0.64$	$\alpha_1=54.3$[1]
$a_2=4.0$		$\alpha_2=37.0$
$a_3=4.0$	$a_3/a_1=0.64$	$\alpha_3=37.0$

$\mu_0=3.92$ D (Stark effect)[2]

temp. (°C)	ε(Ob.)[3] (U.N)	ε(Ob.) (G.P.)[4]	ε(Ob.) (T)	ε(Cal.) (0.7)
15	38.3			37.4
20	37.5		37.45	36.4
25	36.7			35.4
82		26.2		26.3

1) Le Fèvre; loc. cit.
2) S. N. Ghosh, R. Trambarulo and W. Gardy: *J. Chem. Phys.*, **21**, 308 (1953).
3) H. Ulich and W. Nespital; *Z. Physik. Chem.*, **B16**, 221 (1932).
4) F. V. Grimm and W. A. Patrick; *J. Am. Chem. Soc.*, **45**, 2794 (1923).
5) J. Timmermans, A. M. Piette and R. Phillipe; *Bull. Soc. Chim. Belges*, **64**, 5 (1955).

TABLE X

DIELECTRIC CONSTANT OF TERT-BUTYL CHLORIDE

(Å)		(10⁻²⁵ cc.)
$a_1=6.2$	$a_2/a_1=1.11$	$\alpha_1=109.2$[1]
$a_2=6.9$		$\alpha_2=92.6$
$a_3=6.9$	$a_3/a_1=1.11$	$\alpha_3=92.6$

$\mu_0=2.13$ D (Vapour)[2]

temp. (°C)	ε(Ob.) (S)[3]	ε(Cal.) (1.33)
−20	12.2	12.32
−10	11.5	11.58
0	10.95	10.90
10	10.4	10.29
15		10.00
20		9.73
30	9.37	9.19

1) Le Fèvre; loc. cit.
2) B. H. Wismall and C. P. Smyth; *J. Chem. Phys.*, **9**, 356 (1941).
3) W. O. Baker and C. P. Smyth; *J. Am. Chem. Soc.*, **61**, 2798 (1939).

TABLE XI

DIELECTRIC CONSTANT OF CHLOROFORM

(Å)		(10⁻²⁵ cc.)
$a_1=4.6$	$a_2/a_1=1.54$	$\alpha_1=66.8$[1]
$a_2=7.1$		$\alpha_2=90.1$
$a_3=7.1$	$a_3/a_1=1.54$	$\alpha_3=90.1$

$\mu_0=1.05$ D (Vapour)[2]

temp. (°C)	ε(Ob.) (M.L.)[3]	ε(Ob.) (F)[4]	ε(Ob.) (C)[5]	ε(Cal.) (1.54)	ε(Cal.) (1.82)
60	4.12			3.80	4.03
50	4.29	4.31		3.95	4.19
40	4.47	4.47		4.09	4.35
30	4.65	4.64		4.24	4.53
20	4.84	4.81	4.785	4.40	4.71
10	5.02	5.00		4.57	4.90
0	5.22	5.19	5.172	4.74	5.10
−10	5.43	5.40		4.94	5.34
−20	5.65	5.51	5.601	5.15	5.58
−30	5.89			5.38	5.85
−40	6.16		6.095	5.62	6.14
−50	6.45			5.91	6.47
−60	6.79		6.772	6.21	6.83

1) Stuart; loc. cit.
2) S. C. Sircar; *Indian J. Phys.*, **3**, 197.
3) S. C. Morgan and H. H. Lowry; *J. Phys. Chem.*, **34**, 3285 (1930).
4) R. J. W. D. Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).
5) I. E. Coop; *Trans. Faraday Soc.*, **33**, 583 (1937).

TABLE XII

DIELECTRIC CONSTANT OF NITROMETHANE

(Å)		(10⁻²⁵ cc.)
$a_1=5.5$	$a_2/a_1=0.94$	$\alpha_1=51.8$[1]
$a_2=5.2$		$\alpha_2=71.7$
$a_3=4.0$	$a_3/a_1=0.73$	$\alpha_3=18.3$

$\mu_0=3.46$ D (Stark effect)[2]

temp. (°C)	ε(Ob.) (B.M.)[3]	ε(Ob.) (T.P.P.)[4]	ε(Cal.)[5]
10	39.1		31.3
20		38.57	
30	35.9		28.3
50	32.9		25.5
70	30.1		23.1
90	27.6		20.9

1) Le Fèvre; loc. cit.
2) E. Tannenbaum, R. J. Myers and W. D. Gwinn; *J. Chem. Phys.*, **25**, 42 (1956).
3) F. Buckley and A. A. Maryott; Jour. of Research of National Bureau of Standards, **53**, 229 (1954).
4) J. Timmermans, A. M. Piette and R. Phillipe; *Bull. soc. chim. Belges*, **64**, 5 (1955).
5) For asymmetric top molecules the value of dielectric constant is calculated with our formula using as the value of the axial ratio, the value determined with the molecular model.

TABLE XV

DIELECTRIC CONSTANT OF DIETHYL ETHER

(Å) $(10^{-25}$ cc.)

$a_1=4.9$[1] $a_2/a_1=1.80$ $\alpha_1=78.7$[2]

$a_2=8.8$ $\alpha_2=112.6$

$a_3=4.0$ $a_3/a_1=0.82$ $\alpha_3=70.7$

$\mu_0=1.17$ D (Vapour)[3]

temp. (°C)	ε(Ob.) (S)[4]	ε(Ob.) (F)[5]	ε(Ob.) (C)[6]	ε(Ob.) (T)[7]	ε(Ob.) (L.L)[8]	ε(Cal.) (E)[9]	ε(Cal.) (O.S.)[10]
−116	10.42					6.43	9.21
−101	9.05					5.87	8.28
− 80			7.541			5.24	7.18
− 75	7.25					5.11	6.93
− 60	6.55		6.545			4.79	6.37
− 40		5.91	5.791			4.36	5.67
− 30	5.45	5.60				4.18	5.38
− 20		5.325	5.180			4.01	5.09
− 10	4.96	5.066				3.86	4.86
0	4.75	4.803	4.706			3.71	4.64
10		4.575				3.58	4.43
15		4.480				3.52	4.33
18				4.360		3.48	4.28
20	4.29	4.376	4.300			3.46	4.23
25		4.265				3.40	4.13
30		4.152				3.34	4.04
40				3.966		3.22	3.88
60				3.652		3.02	3.57
80				3.375		2.84	3.29
100				3.122		2.65	3.02
120				2.890		2.47	2.78
128					2.716	2.41	2.67
140				2.658		2.30	2.54
143					2.557	2.28	2.50
158					2.392	2.15	2.33
160				2.408		2.13	2.30
168					2.270	2.05	2.20
180				2.124	2.081	1.905	2.02
190				1.885	1.878	1.738	1.814
193				1.533	1.798	1.648	1.702

1) This structure corresponds to the planar zig-zag form.
2) Stuart; loc. cit.
3) L. G. Groves and S. Sudgen; *J. Chem. Soc.*, 1779 (1935).
4) S. A. McNeight and C. P. Smyth; *J. Am. Chem. Soc.*, **58**, 1718 (1936).
5) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).
6) I. E. Coop; *Trans. Faraday Soc.*, **33**, 583 (1937).
7) Karl Tangl; *Ann. d. Physik*; **10**, 748 (1903).
8) N. Litrinoff and W. Litrinoff; *Z. Physik*; **57**, 134 (1929).
9) The value calculated with our formula assuming the value of the axial ratio the value corresponding to the planar zig-zag form.
10) Molecular model is assumed to be the oblate spheroid whose axial ratio is 0.5 : 1 : 1.

TABLE XIII

DIELECTRIC CONSTANT OF METHYLENE CHLORIDE

(Å)		(10^{-25} cc.)
$a_1=4.4$	$a_2/a_1=1.50$	$\alpha_1=59.6$[1]
$a_2=6.6$		$\alpha_2=84.7$
$a_3=4.0$	$a_3/a_1=0.91$	$\alpha_3=50.2$

$\mu_0=1.62$ D (Stark effect)[2]

temp.(°C)	ε(Ob.) (M.L.)[3]	ε(Cal.)
40	8.29	7.57
30	8.71	7.93
20	9.14	8.31
10	9.58	8.72
0	10.02	9.19
−10	10.51	9.62
−20	11.00	10.22
−30	11.56	10.82
−40	12.14	11.46
−50	12.77	12.17
−60	13.49	12.94
−70	14.23	13.78
−80	15.05	14.74
−90	15.97	15.79
−100	16.98	16.94

1) Stuart; loc. cit.
2) R. J. Myers and W. D. Gwinn; *J. Chem. Phys.*, **20**, 1420 (1952.)
3) S. O. Margan and H. H. Lowry; *J. Phys. Chem.*, **34**, 3285 (1930).

TABLE XIV

DIELECTRIC CONSTANT OF DIMETHYL ETHER

(Å)		(10^{-35} cc.)
$a_1=4.3$	$a_2/a_1=1.47$	$\alpha_1=48.6$[1]
$a_2=6.3$		$\alpha_2=63.0$
$a_3=4.0$	$a_3/a_1=0.93$	$\alpha_3=43.1$

$\mu_0=1.30$ D (Vapour)[2]

temp.(°K)	ε(Ob.)[3]	ε(Cal.)
298	5.02	4.45
318	4.54	4.01
338	4.07	3.62
358	3.59	3.22
378	3.12	2.79
398	2.37	2.15

1) Stuart; loc. cit.
2) L. G. Groves and S. Sudgen; *J. Chem. Soc.*, 1779 (1937). K. L. Ramaswamy; *Proc. Indian Acad. Sci.*, **A4**, 108 (1936).
3) J. Marsden and O. Maass; *Can. J. Research*; **B13**, 296 (1935).

TABLE XVI

DIELECTRIC CONSTANT OF *n*-PROPYL ETHER

(Å)		(10^{-25} cc.)
$a_1=4.9$[1]	$a_2/a_1=2.41$	$\alpha_1=117.0$[2]
$a_2=11.8$		$\alpha_2=137.0$
$a_3=4.0$	$a_3/a_1=0.82$	$\alpha_3=122.0$

$\mu_0=1.18$ D (Vapour)[3]

temp.(°C)	ε(Ob.)[4]	ε(Cal.)
26	3.39	3.36

1) These values correspond to the planar zig-zag form.
2) Stuart; loc. cit.
3) G. A. Barclay and R. J. W. Le Fèvre; *J. Chem. Soc.*, 1643 (1952).
4) Pyle; *Phys. Rev.*, **38**, 1057 (1931).

TABLE XVII

DIELECTRIC CONSTANT OF PARALDEHYDE

(Å)		(10^{-25} cc.)
$a_1=4.0$	$a_2/a_1=2.05$	$\alpha_1=116.2$[1]
$a_2=8.2$		$\alpha_2=129.2$
$a_3=8.2$	$a_3/a_1=2.05$	$\alpha_3=129.2$

$\mu_0=1.43$ D (Vapour)[2]

temp.(°C)	ε(Ob.)[3]	ε(Cal.)[4]
20	14.70	11.62
40	12.25	10.23
60	10.30	9.04
80	8.70	8.03
100	7.46	7.14
120	6.42	6.38

1) Le Fèvre; loc. cit.
2) R. J. W. Le Fèvre, J. W. Mulley and B. M. Smyth; *J. Chem. Soc.*, 291 (1950).
3) R. C. Miller and C. P. Smyth; *J. Phys. Chem.*, **60**, 1354 (1956).
4) We assume that the polarizability effective for the dielectric constant is $(P_A+P_E)/P_E$ times the value estimated by Le Fèvre.

TABLE XVIII

DIELECTRIC CONSTANT OF ACETONE

(Å)		(10^{-25} cc.)
$a_1=5.4$	$a_2/a_1=1.24$	$\alpha_1=69.6$[1]
$a_2=6.7$		$\alpha_2=72.2$
$a_3=4.0$	$a_3/a_1=0.74$	$\alpha_3=48.2$

$\mu_0=2.87$ D[2] (Vapour)

temp.(°C)	ε(Ob.) (C.)[3]	ε(Ob.) (E.)[4]	ε(Cal.)
−80	34.5		33.3
−59	31.31		28.6
−40	28.42		25.2
−20	25.91		22.3
0	23.65	21.58	19.8
10		20.49	18.6
15		19.99	18.1
20	21.54	19.54	17.6
25		19.10	17.2
30		18.68	16.6
40	19.38	17.82	15.8
50		17.00	14.9

1) Stuart assumes that the value of the dipole moment is 2.7 D. But we recalculate the values of components of polarizability assuming that $\mu_0=2.87$ D.
2) K. L. Ramaswamy; *Proc. Indian Acad. Sci.*, **A4**, 108 (1936).
3) R. H. Cole; *J. Chem. Phys.*, **9**, 251 (1941).
4) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

TABLE XIX

DIELECTRIC CONSTANT OF METHYL-ETHYL KETONE

(Å)		(10^{-25} cc.)
a_1=5.4[1]	a_2/a_1=1.50	α_1=85.5[2]
a_2=8.1		α_2=98.3
a_3=4.0	a_3/a_1=0.74	α_3=60.2

μ_0=2.87 D[3]

temp. (°C)	ε(Ob.) (C.)[4]	ε(Ob.) (F.)[5]	ε(Cal.)
0	20.30		16.8
5		20.35	16.3
10		19.83	15.9
15		19.33	15.5
20	18.51	18.85	15.1
25		18.41	14.7
40	16.80		13.6
60	15.29		12.3
80	13.89		11.2

1) This assumed structure is the planar zig-zag form.
2) Stuart; loc. cit.
3) We assume that the value of the dipole moment has the same value as that of acetone.
4) R. H. Cole; *J. Chem. Phys.*, **9**, 251 (1941).
5) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

TABLE XX

DIELECTRIC CONSTANT OF DIETHYL KETONE

(Å)		(10^{-25} cc.)
a_1=5.4[1]	a_2/a_1=1.67	α_1=100.1[2]
a_2=9.0		α_2=126.4
a_3=4.0	a_3/a_1=0.74	α_3= 71.5

μ_0=2.87 D[3]

temp. (°C)	ε(Ob.) (C.)[4]	ε(Cal.)
−40	19.77	18.5
−20	19.37	16.4
0	18.90	14.7
20	17.00	13.2
40	15.31	11.9
60	15.83	10.9
80	12.52	9.91
100	11.49	9.08

1) The structure corresponds to the planar zig-zag form.
2) Stuart; loc. cit.
3) We assume that the value of the dipole moment has the same as for acetone.
4) R. H. Cole; *J. Chem. Phys.*, **9**, 251 (1941).

TABLE XXI

DIELECTRIC CONSTANT OF TOLUENE

(Å)		(10^{-25} cc.)
a_1=8.5	a_2/a_1=0.76	α_1=156.4[1]
a_2=6.5		α_2=136.6
a_3=4.0	a_3/a_1=0.47	α_3= 74.8

μ_0=0.37 D (Vapour)[2]

temp. (°C)	ε(Ob.)[3]	ε(Cal.)
−50	2.5889	2.563
−33	2.5336	2.504
−15	2.4785	2.450
0	2.4350	2.406
10	2.4065	2.377
25	2.3661	2.337
35	2.3421	2.312
45	2.3196	2.286
60	2.2846	2.252
80	2.2449	2.205
100	2.2061	2.159
110	2.1901	2.139

1) Stuart; loc. cit.
2) J. W. Baker and L. G. Groves; *J. Chem. Soc.*, 1144 (1939).
3) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

TABLE XXII

DIELECTRIC CONSTANT OF *o*-XYLENE

(Å)		(10^{-25} cc.)
a_1=7.8	a_2/a_1=0.92	α_1=163.9[1]
a_2=7.1		α_2=135.2
a_3=4.0	a_3/a_1=0.51	α_3=107.5

μ_0=0.62 D (Vapour)[2]

temp. (°C)	ε(Ob.)[3]	ε(Cal.)
−20	2.701	2.768
0	2.648	2.679
20	2.594	2.599
40	2.541	2.526
60	2.488	2.459
80	2.434	2.399
100	2.381	2.341
120	2.328	2.287
130	2.302	2.258

1) Le Fèvre; loc. cit.
2) E. C. Hurdis, and C. P. Smyth; *J. Am. Chem. Soc.*, **64**, 2212 (1942).
3) L. M. Heil; *Phys. Rev.*, **39**, 666 (1932).

TABLE XXIII

DIELECTRIC CONSTANT OF CHLOROBENZENE

(Å)		(10^{-25} cc.)
a_1=8.5	a_2/a_1=0.76	α_1=155.1[1]
a_2=6.5		α_2=138.2
a_3=3.7	a_3/a_1=0.44	α_3= 74.2

μ_0=1.70 D[2] (Vapour)

temp. (°C)	ε(Ob.) (F.)[3]	ε(Ob.) (S.)[4]	ε(Ob.) (C.)[5]	ε(Cal.)
−50		7.28		7.88
−40			6.872	7.54
−30		6.76		7.20
−20			6.401	6.92
−10		6.26		6.64
0			5.982	6.40
10		5.82		6.15
20			5.605	5.95
21	5.670			5.93

25	5.612		5.84
30		5.46	5.75
40	5.372		5.55
48			5.41
50		5.15	5.38
70	4.886	4.89	5.04
80	4.768		4.90
96.2	4.521		4.66
100		4.52	4.61
106	4.435		4.53
115	4.314		4.42
130		4.17	4.24
131	4.144		4.23

1) Stuart assumes that the dipole moment has the value of 1.60 D. However we recalculate the polarizability value assuming $\mu_0=1.70$ D.

2) L. G. Groves and S. Sudgen; *J. Chem. Soc.*, 1094 (1934).

3) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

4) C. P. Smyth and S. O. Morgan; *J. Am. Chem. Soc.*, **50**, 1547 (1928).

5) I. E. Coop; *Trans. Faraday Soc.*, **33**, 583 (1937).

TABLE XXIV

DIELECTRIC CONSTANT OF BROMOBENZENE

(Å)		(10^{-25} cc.)
$a_1=8.8$	$a_2/a_1=0.74$	$\alpha_1=168.4$[1]
$a_2=6.5$		$\alpha_2=121.3$
$a_3=3.9$	$a_3/a_1=0.44$	$\alpha_3=95.6$

$\mu_0=1.64$ D[2] (Vapour)

temp.(°C)	ε(Ob.)[3]	ε(Cal.)
1	5.74	6.37
25	5.39	5.84
40	5.18	5.58
55	4.96	53.0

1) Le Fèvre; loc. cit.

2) R. J. W. Le Fèvre and Narayana Rao; *Australian J. Chem.*, **8**, 140 (1955).

3) W. A. Hestone, E. T. Hennelly and C. P. Smyth; *J. Am. Chem. Soc.*, **72**, 2071 (1950).

TABLE XXV

DIELECTRIC CONSTANT OF FLUOROBENZENE

(Å)		(10^{-25} cc.)
$a_1=7.6$	$a_2/a_1=0.85$	$\alpha_1=112.6$[1]
$a_2=6.5$		$\alpha_2=110.6$
$a_3=3.7$	$a_3/a_1=0.49$	$\alpha_3=71.1$

$\mu_0=1.57$ D[2] (Vapour)

temp.(°C)	ε(Ob.)[3]	ε(Cal.)
25	5.42	5.18
60	4.76	4.58

1) Le Fèvre; loc. cit.

2) K. B. McAlpine and C. P. Smyth; *J. Chem. Phys.*, **3**, 55 (1935).

3) A. A. Maryott and E. R. Smyth; "Table of Dielectric Constants of Pure Liquid." NBS Circular 514 (1951).

TABLE XXVI

DIELECTRIC CONSTANT OF IODOBENZENE

(Å)		(10^{-25} cc.)
$a_1=9.2$	$a_2/a_1=0.71$	$\alpha_1=198.4$[1]
$a_2=6.5$		$\alpha_2=140.7$
$a_3=4.3$	$a_3/a_1=0.47$	$\alpha_3=113.6$

$\mu_0=1.70$ D[2] (Vapour)

temp.(°C)	ε(Ob.)[3]	ε(Cal.)
20	4.625	5.48

1) Le Fèvre; loc. cit.

2) E. C. Hurdis and C. P. Smyth; *J. Am. Chem. Soc.*, **64**, 2212 (1942). R. J. W. Le Fèvre and Narayana Rao; *Australian J. Chem.*, **8**, 140 (1955).

3) A. Audsley and Goss; *J. Chem. Soc.*, 497 (1942).

TABLE XXVII

DIELECTRIC CONSTANT OF *o*-DICHLOROBENZENE

(Å)		(10^{-25} cc.)
$a_1=7.7$	$a_2/a_1=0.92$	$\alpha_1=176.8$[1]
$a_2=7.1$		$\alpha_2=158.5$
$a_3=4.3$	$a_3/a_1=0.55$	$\alpha_3=89.7$

$\mu_0=2.50$ D[2] (Vapour)

temp.(°C)	ε(Ob.)[3]	ε(Cal.)
0	11.130	13.0
25	9.930	11.6
50	8.900	10.4

1) Stuart assumes that the value of the dipole moment is 2.25 D. But we recalculate the values of the components of polarizability assuming that $\mu_0=2.50$ D.

2) E. M. Moore and M. E. Hobbs; *J. Am. Chem. Soc.*, **71**, 411 (1949). E. C. Hurdis and C. P. Smyth; *J. Am. Chem. Soc.*, **64**, 2212 (1942).

3) C. P. Smyth and S. P. Morgan; *J. Am. Chem. Soc.*, **50**, 411 (1928).

TABLE XXVIII

DIELECTRIC CONSTANT OF *m*-DICHLOROBENZENE

(Å)		(10^{-25} cc.)
$a_1=7.1$	$a_2/a_1=1.28$	$\alpha_1=158.2$[1]
$a_2=9.1$		$\alpha_2=178.4$
$a_3=3.7$	$a_3/a_1=0.52$	$\alpha_3=90.4$

$\mu_0=1.72$ D (Vapour)[2]

temp.(°C)	ε(Ob.)[3]	ε(Cal.)
0	5.403	6.97
25	5.039	6.34
50	4.703	5.82

1) Stuart assumes that the value of dipole moment is 1.48 D. But we recalculate the values of the components of polarizability assuming that $\mu_0=1.72$ D.

2) L. G. Groves and S. Sudgen; *J. Chem. Soc.*, 1782 (1937).

3) C. P. Smyth and S. O. Morgan; *J. Am. Chem. Soc.*, **50**, 1547 (1928).

TABLE XXIX

DIELECTRIC CONSTANT OF BENZONITRILE

(Å)		(10^{-25} cc.)
$a_1=9.2$	$a_2/a_1=0.71$	$\alpha_1=163.8$[1]
$a_2=6.5$		$\alpha_2=121.1$
$a_3=3.7$	$a_3/a_1=0.41$	$\alpha_3=84.9$

$\mu_0=4.14$ D (Stark effect)[2]

temp. (°C)	ε(Ob.) (M.)[3]	ε(Ob.) (T.)[4]	ε(Cal.)
0	27.6		26.7
18	25.85		24.6
20		25.58	24.2
25	25.2		23.7
30			23.2
40	24.0		22.2
50			21.3
50.3	23.28		21.2
60	22.7		20.3
70	22.1		19.5

1) Le Fèvre; loc. cit.
2) Lide; *J. Chem. Phys.*, **22**, 1577 (1954).
3) A. R. Martin; *Trans. Faraday Soc.*, **33**, 191 (1938).
4) J. Timmermans; A. M. Piette and R. Phillippe; *Bull. soc. chim. Belges*, **64**, 5 (1955).

TABLE XXX

DIELECTRIC CONSTANT OF NITROBENZENF

(Å)		(10^{-25} cc.)
$a_1=8.5$	$a_2/a_1=0.76$	$\alpha_1=171.6$[2]
$a_2=6.5$		$\alpha_2=141.9$
$a_3=3.7$	$a_3/a_1=0.44$	$\alpha_3=74.1$

$\mu_0=4.19$ D (Vapour)[3]

temp. (°C)	ε(Ob.)[4]	ε(Cal.)
10	37.85	28.0
25	34.89	26.1
30	33.97	25.5
40	32.26	24.4
50		23.4
60	29.08	22.4
70		21.4
90	24.88	19.8
110	22.68	18.3
130	20.79	16.9
150	19.27	15.8
170	18.15	14.6
200	15.95	13.1
211	15.61	12.7

1) The structure corresponds to the planar form.
2) Stuart assumes that the value of the dipole moment is 3.92 D. However we re-calculate the value of polarizability assuming $\mu_0=4.19$ D.
3) K. B. McAlpine and C. P. Smyth; *J. Chem. Phys.*, **55**, (1935).
4) R. J. W. Le Fèvre; *Trans. Faraday Soc.*, **34**, 1127 (1938).

TABLE XXXI

DIELECTRIC CONSTANT OF PYRIDINE

(Å)		(10^{-25} cc.)
$a_1=6.6$	$a_2/a_1=0.98$	$\alpha_1=108.4$[1]
$a_2=6.5$		$\alpha_2=118.8$
$a_3=3.7$	$a_3/a_1=0.56$	$\alpha_3=57.8$

$\mu_0=2.15$ D[2] (Stark effect)

temp. (°C)	ε(Ob.)[3]	ε(Cal.)
1	14.65	12.0
20	13.55	11.0
40	12.45	10.1
60	11.44	9.26

1) Stuart; loc. cit.
2) B. B. De More, W. S. Wilcox and J. H. Goldstein; *J. Chem. Phys.*, **22**, 876 (1954).
3) Russel, Holland and C. P. Smyth; *J. Phys. Chem.*, **59**, 1088 (1955).

TABLE XXXII

DIELECTRIC CONSTANT OF QUINOLINE

(Å)		(10^{-25} cc.)
$a_1=7.1$	$a_2/a_1=1.25$	$\alpha_1=165$[1]
$a_2=8.9$		$\alpha_2=224$
$a_3=3.7$	$a_3/a_2=0.52$	$\alpha_3=79.5$

$\mu_0=2.29$ D[2] (Vapour)

temp. (°C)	ε(Ob.)[3]	ε(Cal.)
1	9.70	10.19
20	9.03	9.44
40	8.40	8.77
90	7.81	8.19

1) Le Fèvre; loc. cit.
2) A. D. Buckinghas, J. Y. H. Chan, H. C. Freeman, R. J. W. Le Fèvre, D. A. A. S. Narayana Rao and J. Tardif; *J. Chem. Soc.*, 1405 (1956).
3) Russell, Holland and C. P. Smyth; *J. Phys. Chem.*, **59**, (1955).