Dipole Moment of Thionitrosylchloride

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The microwave spectrum of Thionitrosylchloride, NSCl, has been investigated by BEPPU, HIROTA, and MORINO [1] who determined the rotational constants, the structure and the force constants.

In the present work the dipole moment is determined. A sample of $N_3S_3Cl_3$ was kindly given to me by Dr. J. WEGENER of the University of Göttingen: NSCl is than obtained by heating the $N_3S_3Cl_3$ to 50 °C under high vacuum. The measurement has been made with a conventional 100 kHz Stark modulated spectrometer with automatic frequency markers [2–4]; frequency measurements are believed to be accurate within ±0.03 MHz.

The electric field was calibrated by means of the $J=1\rightarrow J'=2$ transition of OCS using the value of 0.7152 [5] D for the dipole moment.

The measurements have been performed on the $J=0_{00}\rightarrow J'=1_{11}$ line at 45,460.22 MHz in the high field approximation and further on the $F=7/2\rightarrow F'=7/2$ hyperfine line at 38,360.62 MHz of the $J=2_{02}\rightarrow J'=2_{11}$ transition and the $F=9/2\rightarrow F'=9/2$ hyperfine line at 38,933.92 MHz of the $J=3_{03}\rightarrow J'=3_{12}$ transition whose Stark Effect is independent of the quadrupole energy. In Table 1 the measured and calculated slopes for these lines are given, and in Table 2 the dipole moment components along the two principal axes of inertia and the total dipole moment are listed.

Table 1. Measured and calculated slopes $\Delta\nu/E^2$ in MHz/(V/cm)^2.

$J_{k-1,k_1}\rightarrow J'_{k'-1,k_1'}$	$F\rightarrow F'$	$\Delta\nu/E^2$ obs.	calc.
$2_{0,2}\rightarrow 2_{1,1}$	$7/2\rightarrow 7/2$	2.212±0.05	2.218
$3_{0,3}\rightarrow 3_{1,2}$	$9/2\rightarrow 9/2$	1.688±0.020	1.684
	$M_J, M_I\rightarrow M_J', M_I'$		
$0_{0,0}\rightarrow 1_{1,1}$ [a]	$0,3/2\rightarrow 0,3/2$ $0,1/2\rightarrow 0,1/2$	1.527±0.015	1.532

[a] Measured in high field condition.

$\lvert\mu_a\rvert$	$=0.57\pm0.03$
$\lvert\mu_b\rvert$	$=1.77\pm0.02$
$\lvert\mu_{tot}\rvert$	$=1.87\pm0.02$

Table 2. Values for the two components and for the total electric dipole moment in Debye.

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BERICHTIGUNG

Erratum. B. D. HANSON, M. MAHNIG, and LOUIS E. TOTH, Low Temperature Heat Capacities of Transition Metal Borides, Z. Naturforsch. **26 a**, 739 [1971].

P. 739, column 2, line 13 ff from bottom should read: There is, however, little general agreement on the number of electrons transferred per boron atom . . .;
p. 743, Table 3, line 3: $(Mn_{.9}Fe_{.1})_2B$, line 6: $(Mn_{.1}Fe_{.9})_2B$, line 13: $(Co_{.9}Ni_{.1})_2B$;
p. 743, Table 6, line 2: $Co_{.98}B_{.02}$.

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