Ti ist in Form einer tetragonalen Pyramide von vier Cl-Atomen in der Basis und einem O-Atom in der Spitze umgeben. Der Winkel O–Ti–Cl(1) beträgt annähernd 102°. Wichtige Abstände des Anions sind in Tabelle 2 enthalten.

Tabelle 2. *Abstände am Anion*

Ti——Cl(1)	2,34 Å
Ti——Cl(2′)	2,32
Ti——O	1,79
Cl(1)–Cl(2)	3,24

Der relativ kurze Bindungsabstand Ti–O = 1,79 Å deutet auf eine zusätzliche $p\pi$–$d\pi$-Bindung zwischen Titan und Sauerstoff. Das grosse Tetraäthylammonium-Kation könnte verantwortlich gemacht werden für die Ausbildung der monomeren Struktur, denn nach spektroskopischen Untersuchungen (Feltz, 1967) am $[NH_3(C_2H_5)]_2TiCl_4O$ und Rb_2TiCl_4O liegt es nahe, dass es bei diesen Verbindungen zu einer Wechselwirkung zwischen den Anionen und zur Ausbildung von Sauerstoffbrücken kommen wird, wobei sich die Koordinationszahl am Titan auf 6 erhöhen müsste.

Die schwach grünliche, stark hygroskopische Verbindung $[N(C_2H_5)_4]_2VCl_4O$ (Feltz, 1966) mit 4-wertigem Vanadin kristallisiert in der gleichen Raumgruppe wie $[N(C_2H_5)_4]_2TiCl_4O$. Die Gitterparameter sind:

$$a = b = 10{,}12 \pm 0{,}03\ \text{Å}$$
$$c = 12{,}68 \pm 0{,}04$$
$$V = 1299\ \text{Å}^3$$
$$\varrho_{\text{exp}} = 1{,}23\ \text{g.cm}^{-3}\ .$$

Auf Grund des Vergleiches der Intensitäten aus Weissenberg–Böhm-Aufnahmen um [110] (0.–2. Schicht) von beiden Verbindungen darf auf Isomorphie zwischen $[N(C_2H_5)_4]_2TiCl_4O$ und $[N(C_2H_5)_4]_2VCl_4O$ geschlossen werden. Danach liegen auch in der Vanadinverbindung isolierte VCl_4O-Gruppen mit tetragonal-pyramidaler Anordnung vor.

Herrn Professor Dunken danken wir für die Unterstützung bei den Untersuchungen und Herrn Dr Feltz für die Präparation der Substanzen.

Literatur

Feltz, A. (1965). *Z. anorg. allg. Chem.* **334**, 242.
Feltz, A. (1966). Persönliche Mitteilung.
Feltz, A. (1967). *Z. Chem.* **7**, 158.

Acta Cryst. (1968). B**24**, 283

A reinvestigation of the crystal structure of decammine-μ-amido-dicobalt pentanitrate*.

By William P. Schaefer†, A. W. Cordes‡ and Richard E. Marsh, *Gates and Crellin Laboratories of Chemistry, California Institute of Technology, Pasadena, California, U.S.A.*

(*Received* 18 *July* 1967)

The crystal structure of $(NH_3)_5Co(NH_2)Co(NH_3)_5(NO_3)_5$ has been reinvestigated. A satisfactory refinement has been carried out in space group $P4_2/mnm$, based on three-dimensional Fe $K\alpha$ data collected on an automated diffractometer; the R index is 0·076 for 357 reflections. Although the dimensions of the cation are similar to those found earlier by Vannerberg, its orientation within the cell is different. The cation is severely strained, the Co–N(bridge) distances being 2·06 Å and the Co–N–Co angle 153°. The crystals are approximately isostructural with those of the corresponding O_2-bridged compound; they probably contain a small and variable amount of water of crystallization.

As part of a program of investigation on bridged dicobalt compounds, we have reinvestigated the crystal structure of decammine-μ-amido-dicobalt pentanitrate,

$$(NH_3)_5Co(NH_2)Co(NH_3)_5(NO_3)_5\ .$$

Although we find the molecular structure to be very similar to that reported in an earlier investigation (Vannerberg, 1963), the crystal structure is significantly different.

Experimental

Crystals of the red compound, in the form of thin needles and small prisms, were kindly furnished by Professor C. Brubaker. The analysis for cobalt was reported as 19·1 %; calculated for the anhydrous nitrate, 19·2 %. Preliminary Weissenberg photographs of several crystals all showed tetragonal symmetry but with appreciable variations in diffraction patterns, both in regard to intensities and cell dimensions; the variations were particularly large in going from a needle-shaped crystal (for which reflections $hk0$ with $h+k$ odd were unobservably weak) to a prismatic crystal (for which many such reflections could be observed, although they were of low intensity). All the data on which this report is based were obtained from a needle-shaped crystal; the intensities are in good general agreement with the values reported by Vannerberg (1963).

Unit-cell dimensions were measured on a diffractometer with Fe $K\alpha$ radiation ($\lambda = 1{\cdot}9373$ Å). Our values are $a = 11{\cdot}79$, $c = 8{\cdot}27$ Å, both $\pm 0{\cdot}01$; Vannerberg reports $a = 11{\cdot}68 \pm 0{\cdot}03$, $c = 8{\cdot}28 \pm 0{\cdot}02$ Å. This discrepancy is within the variation we find among different crystals.

Intensity data were collected on a Datex-automated General Electric diffractometer using MnO_2-filtered iron radiation. (Attempts were first made to collect the data with the use of copper radiation, but the crystal deteriorated extensively during the process.) The crystal was cut to an approximate cube, about 0·1 mm on an edge ($\mu t \simeq 0{\cdot}3$). A periodic check of a standard reflection showed an ap-

---

* Contribution no. 3535 from the Gates and Crellin Laboratories. This work was supported in part by Grant GP-5768 from the National Science Foundation.

† Present address: Department of Chemistry, University of California, Davis, California, U.S.A.

‡ Present address: Department of Chemistry, University of Arkansas, Fayetteville, Arkansas, U.S.A.

Table 1. *The final atomic parameters*

Values in parentheses are standard deviations of those parameters obtained from least-squares calculations; the remaining parameters were obtained from difference maps. The columns labelled M and F give the number of atoms of each kind in the unit cell and the fractional occupancy of the sites. Anisotropic temperature factors are given in the form $\{\exp[-(\beta(11)h^2+\beta(22)k^2+\beta(33)l^2+\beta(12)hk+\beta(13)hl+\beta(23)kl)]$.

		M	F	x	y	z	$\beta(11)$ or B	$\beta(22)$	$\beta(33)$	$\beta(12)$	$\beta(13)$	$\beta(23)$
	Co	4	1	0·1199 (1)	x	0	0·0057 (1)	$\beta(11)$	0·0102 (3)	0·0018 (3)	0	0
	N(1)	2	$\frac{1}{2}$	0·0290 (15)	$-x$	0	4·8 (6)					
	N(2)	8	$\frac{1}{2}$	0·2217 (11)	0·0565 (11)	0·1667 (15)	2·8 (3)					
	N(3)	8	$\frac{1}{2}$	0·0242 (13)	0·1869 (13)	0·1709 (18)	4·1 (3)					
	N(4)	4	$\frac{1}{2}$	0·2166 (19)	0·2550 (19)	0	6·2 (6)					
Nitrate group I	N	4	$\frac{1}{2}$	0·7571 (15)	0·2668 (16)	0	2·8 (3)					
	O	4	$\frac{1}{2}$	0·6851 (12)	0·3440 (12)	0	3·6 (3)					
	O	8	$\frac{1}{2}$	0·7946 (10)	0·2316 (10)	0·1298 (10)	4·2 (2)					
Nitrate group II	N	2	$\frac{1}{2}$	0·4811 (24)	x	0	3·6 (10)					
	O	2	$\frac{1}{2}$	0·5543 (24)	x	0	0·0063 (19)	$\beta(11)$	0·0551 (136)	0	0	0
	O	4	$\frac{1}{2}$	0·4454 (16)	x	0·1255 (18)	0·0150 (17)	$\beta(11)$	0·0157 (27)	0·0197 (36)	0·0124 (37)	$\beta(13)$
Nitrate group III	N	4	$\frac{1}{4}$	−0·0326 (19)	0·5024 (35)	0·0225 (44)	6·0					
	O	4	$\frac{1}{4}$	−0·0086 (28)	0·4011 (25)	0·0504 (37)	8·0					
	O	4	$\frac{1}{4}$	0·0670 (26)	0·5681 (30)	0·0438 (40)	8·0					
	O	4	$\frac{1}{4}$	−0·1200 (23)	0·5475 (24)	0·0410 (36)	8·0					
	H_2O	1	$\frac{1}{8}$	0·1940 (80)	0·4026 (76)	0	8·0					
N(1)	H	4	$\frac{1}{2}$	0·067	$-x$	0·100	5·0					
N(2)	H	8	$\frac{1}{2}$	0·213	−0·033	0·166	5·0					
	H	8	$\frac{1}{2}$	0·302	0·076	0·141	5·0					
	H	8	$\frac{1}{2}$	0·200	0·086	0·276	5·0					
N(3)	H	8	$\frac{1}{2}$	−0·051	0·138	0·179	5·0					
	H	8	$\frac{1}{2}$	0·007	0·274	0·138	5·0					
	H	8	$\frac{1}{2}$	0·065	0·187	0·276	5·0					
N(4)	H	4	$\frac{1}{2}$	0·328	0·168	0	5·0					
	H	8	$\frac{1}{2}$	0·255	0·268	0·099	5·0					

preciable drop-off in intensity toward the end of the collection period, the final intensity measurements being only 93 % as large as the starting values. Variances $\sigma(F_o^2)$ were assigned on the basis of counting statistics but including an additional term, equal to $(0{\cdot}02F_o^2)^2$, to take account of crystal decomposition and other, unknown experimental errors.

Severe disorder has limited the accuracy of the refinement. The final set of parameters was derived by difference-map and least-squares calculations, starting with the positions of the cobalt atoms given by Vannerberg (1963); they are given in Table 1. Observed and calculated structure factors are given in Table 2, and sections of the electron density calculated at the conclusion of the refinement are shown in Fig. 1. All calculations were carried out on an IBM 7094 computer using the CRYRM system (Duchamp, 1964). Atomic form factors for Co, N, and O were taken from *International Tables for X-ray Crystallography* (1962), the values for cobalt having been corrected by $-1{\cdot}74$ electrons to take account of anomalous dispersion (Cromer, 1965); form factors for hydrogen were taken from Stewart, Davidson & Simpson (1965). The quantity minimized in the full-matrix least-squares calculations was $\Sigma w(F_o^2-F_c^2)^2$, with weights w equal to $1/\sigma^2(F_o^2)$. The hydrogen atoms were positioned on chemical grounds with difference maps as guides. In the final least-squares calculations all the heavy-atom parameters given in Table 2 were adjusted except

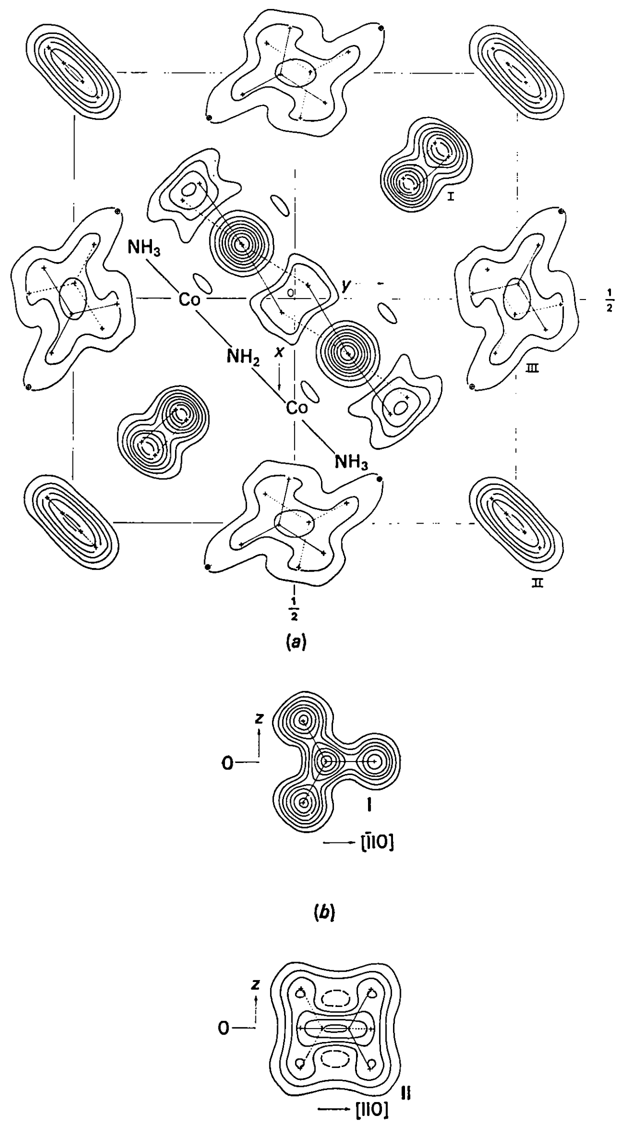

Fig. 1. Electron density maps calculated at the conclusion of the refinement. (*a*) The section $z=0$. (*b*) A section parallel to (110), through nitrate group I. (*c*) A section parallel to (1̄10), through nitrate group II. Contours are at 1, 2, 3... e.Å^{-3} except around the cobalt atoms, where they are at 1, 5, 10, 15... e.Å^{-3}. Crosses indicate the final atomic positions All heavy atoms are shown except for the nitrogen atoms N(2) and N(3), which complete the octahedra about the cobalt atoms.

Table 2. *Observed structure factors, their standard deviations, and the final calculated structure factors* (*all* × 10)

Asterisks in the column of standard deviations indicate reflections assigned zero weight in the least-squares calculations.

	H 0 0		
0	---	**	6379
2	137	3	137
4	503	8	442
6	311	5	-318
8	224	5	236
10	35	9	20
	H 1 0		
1	567	9	662
2	791	12	-838
3	622	24	-655
4	115	3	-132
5	131	4	83
6	440	7	431
7	100	4	-4
8	114	4	-94
9	184	4	159
10	143	4	-129
11	127	3	-119
	H 2 0		
2	1003	15	1020
3	461	7	-478
4	316	5	-362
5	385	6	430
6	230	4	211
7	229	5	237
8	52	6	-70
9	176	4	-164
10	115	4	99
11	206	4	-213
	H 3 0		
3	330	5	369
4	742	11	755
5	327	6	353
6	461	7	469
7	193	4	-180
8	360	6	343
9	189	4	-182
10	258	5	-247
11	31	6	67
	H 4 0		
4	1002	15	1057
5	130	4	131
6	59	5	-54
7	280	5	248
8	298	5	-291
9	95	4	95
10	118	4	-90
11	87	4	-80
	H 5 0		
5	608	10	648
6	117	4	-140
7	157	4	-180
8	93	5	94
9	271	5	-234
10	123	3	108
	H 6 0		
6	347	6	328
7	265	5	-261
8	65	5	-10
9	118	4	136
10	17	10	9
	H 7 0		
7	244	5	258
8	69	4	-46
9	83	3	88
	H 8 0		
8	246	4	227
	H 0 1		
1	653	10	680
3	739	11	-617
5	179	4	-186
7	109	4	134
9	403	7	445
11	154	4	-153
	H 1 1		
1	118	3	-98
2	300	5	-306
3	860	13	-827
4	361	6	-407
5	146	3	142
6	137	4	-164
8	339	6	317
9	118	4	-117
10	137	4	117
11	153	3	-155
	H 2 1		
2	750	11	-726
3	340	6	-334
4	473	7	-482
5	111	3	-112
6	487	8	438
7	151	4	161
8	122	4	106
9	25	10	-2
10	272	5	-252
11	---	**	27
	H 3 1		
3	167	3	-146
4	159	4	164
5	165	4	182
6	203	4	212
7	312	6	324
8	258	5	-254
9	128	4	-128
10	---	**	24
11	163	3	-145
	H 4 1		
4	67	4	26
5	575	9	562
6	138	4	-154
7	355	6	-367
8	93	5	89
9	308	6	-291
10	20	10	12
11	56	3	63
	H 5 1		
5	115	4	-120
6	52	6	-25
7	272	5	-272
8	301	6	-240
9	114	4	113
10	68	4	-31
	H 6 1		
6	473	8	-501
7	11	17	-25
8	154	4	-106
9	73	4	-85
10	204	4	211
	H 7 1		
7	210	4	-208
8	101	4	119
9	76	3	42
	H 8 1		
8	---	**	-4
	H 0 2		
0	1560	**	2152
2	233	4	278
4	475	8	-449
6	129	4	-146
8	430	7	460
10	52	5	23
	H 1 2		
1	16	8	-56
2	551	9	-547
3	310	5	-294
4	416	7	360
5	369	6	-384
6	467	8	448
7	254	5	250
8	96	5	97
9	147	4	133
10	146	4	-147
11	75	3	-60
	H 2 2		
2	1180	18	1214
3	461	7	-463
4	65	4	-83
5	454	7	441
6	73	4	45
7	341	6	346
8	9	17	-29
9	129	4	-144
10	53	5	24
11	151	3	-150
	H 3 2		
3	740	11	685
4	146	4	-153
5	248	5	253
6	507	29	520
7	161	4	-169
8	64	21	60
9	147	4	-148
10	144	4	-130
11	32	4	12
	H 4 2		
4	749	7	736
5	43	6	-7
6	15	14	-30
7	81	5	65
8	139	4	-144
9	28	8	-7
10	98	3	-92
	H 5 2		
5	324	6	326
6	117	4	-102
7	92	5	-71
8	40	7	23
9	223	4	-196
10	74	3	84
	H 6 2		
6	155	4	165
7	124	4	-133
8	110	4	-73
9	91	3	96
	H 7 2		
7	37	7	37
8	91	3	-80
9	96	3	109
	H 8 2		
8	249	5	248
	H 0 3		
1	64	3	-62
3	153	4	-156
5	846	13	-832
7	421	7	408
9	210	4	223
11	44	3	-41
	H 1 3		
1	335	5	-324
2	441	7	396
3	27	7	-60
4	576	9	-553
5	291	5	284
6	141	4	-154
7	351	6	356
8	299	6	281
9	12	15	-31
10	54	5	30
11	171	3	-168
	H 2 3		
2	410	7	-437
3	137	4	130
4	169	13	-143
5	37	7	9
6	560	9	529
7	71	5	-36
8	144	4	153
9	22	11	-40
10	227	4	-208
	H 3 3		
3	661	10	-611
4	424	7	421
5	251	5	238
6	93	5	102
7	234	5	233
8	185	4	-187
9	187	4	-184
10	79	4	-75
	H 4 3		
4	230	5	-221
5	242	5	244
6	98	5	102
7	91	5	-89
8	159	4	-142
9	269	5	-243
10	---	**	52
	H 5 3		
5	45	7	52
6	41	7	25
7	177	4	-178
8	171	4	-137
9	97	3	95
	H 6 3		
6	262	5	-249
7	115	4	-95
8	15	10	19
9	31	5	-20
	H 7 3		
7	52	5	-43
8	102	3	121
	H 0 4		
0	728	11	722
2	176	4	189
4	561	9	-553
6	22	12	35
8	409	7	381
10	27	6	31
	H 1 4		
1	102	4	96
2	617	10	-597
3	274	5	-278
4	326	6	296
5	272	5	-274
6	172	4	155
7	243	5	233
8	146	4	151
9	129	4	131
10	144	3	-152
	H 2 4		
2	297	5	307
3	341	6	-370
4	49	6	77
5	239	5	235
6	59	6	50
7	279	5	277
8	76	3	3
9	97	4	-97
10	76	3	56
	H 3 4		
3	356	6	322
4	280	5	-284
5	233	5	242
6	398	7	393
7	168	4	-161
8	32	8	-24
9	68	4	-62
	H 4 4		
4	432	7	462
5	17	14	13
6	---	**	9
7	33	8	2
8	116	4	-117
9	25	6	11
	H 5 4		
5	147	4	132
6	194	4	-203
7	---	**	-24
8	40	5	36
9	213	4	-192
	H 6 4		
6	107	4	98
7	131	3	-128
8	121	3	-101
	H 7 4		
7	35	5	-39
	H 0 5		
1	442	7	435
3	152	4	-152
5	354	6	-350
7	138	4	109
9	140	3	153
	H 1 5		
1	300	5	-258
2	50	6	61
3	209	4	-208
4	265	5	-253
5	70	5	55
6	79	5	-79
7	126	4	139
8	161	4	153
9	50	4	-58
	H 2 5		
2	412	7	-371
3	213	5	-219
4	53	6	-68
5	86	5	53
6	265	5	269
7	75	4	-72
8	82	4	92
9	28	5	32
	H 3 5		
3	146	4	-163
4	218	5	215
5	206	5	191
6	58	6	66
7	233	5	226
8	175	4	-179
	H 4 5		
4	87	5	95
5	247	5	257
6	76	4	78
7	146	4	-142
8	24	6	14
	H 5 5		
5	37	7	-52
6	54	5	64
7	162	4	-162
8	170	3	-171
	H 6 5		
6	325	6	-314
7	17	7	-4
	H 0 6		
0	1031	16	998
2	51	6	-61
4	95	4	-82
6	47	6	-18
8	186	4	180
	H 1 6		
1	293	5	339
2	389	7	-376
3	200	16	-200
4	27	10	-27
5	38	7	-44
6	104	4	88
7	64	4	59
8	9	9	4
	H 2 6		
2	72	5	44
3	247	4	-242
4	54	6	-23
5	154	4	153
6	87	4	84
7	147	3	160
	H 3 6		
3	126	4	107
4	75	5	70
5	164	4	151
6	207	4	202
7	107	3	-108
	H 4 6		
4	400	7	407
5	43	6	34
6	---	**	8
7	102	3	101
	H 5 6		
5	204	4	204
6	143	3	-160
	H 0 7		
1	210	4	220
3	219	4	-206
5	132	3	-150
	H 1 7		
1	45	6	-20
2	68	4	-52
3	255	5	-267
4	155	4	-153
5	88	3	80
6	49	3	-50
	H 2 7		
2	261	5	-249
3	58	5	-68
4	84	4	-91
5	50	4	-48
6	182	4	186
	H 3 7		
3	67	4	-60
4	96	3	91
5	51	3	40
	H 4 7		
4	38	4	65
	H 0 8		
0	404	7	372
2	64	3	-83
	H 1 8		
1	144	3	178
2	124	3	-126
3	68	3	-58
	H 2 8		
2	200	4	215

the temperature factors of nitrate group III and of the water molecule; these parameters are extensively coupled with the coordinates. The final shifts were all less than 0·4σ. The final R index is 0·076 for 357 observed reflections of non-zero weight; the goodness of fit, $[\Sigma w(F_o^2-F_c^2)^2/(m-s)]^{\frac{1}{2}}$, is 4·0.

The structure we find is almost identical – except for the changes in dimensions in the cation associated with replacing an O_2 bridge with an NH_2 bridge – with that of the μ-peroxo compound $(NH_3)_5Co(O_2)Co(NH_3)_5(NO_3)_5$ (Marsh & Schaefer, 1968). As in that compound, the structure we have derived is based on the space group $P4_2/mnm$ – the highest symmetry space group consistent with the systematic absences. There seems to be no advantage in assuming a lower symmetry, as the disorder (which affects every atom in the structure except for the cobalt) would remain while the number of parameters would increase.

Discussion

The largest difference between the structure we have found and that derived by Vannerberg (1963) is in the orientation of the $(NH_3)_5Co(NH_2)Co(NH_3)_5^{5+}$ cation. Vannerberg assumed the polar space group $P4_2nm$ with the cation positioned on a twofold axis parallel to **c** and on a mirror plane parallel to $(1\bar{1}0)$; we find it to be rotated 90° from this orientation, lying on a mirror plane parallel to (001). The disorder allows the cation to accomodate the diagonal mirror plane (Fig. 1).

The cation is shown in Fig. 2. It is obviously highly strained, as manifested by the extreme length of the Co–N(1) bond (about 0·1 Å longer than the normal value for a Co–N distance) and the almost ridiculous valency angle at N(1). The strain is caused by interactions between ammonia groups N(3) in the two halves of the cation; it is partly relieved by an enlargement of the N(1)–Co–N(3) angles to 93°.

Nitrate group I (Fig. 1) is satisfactorily represented by two sets of isotropic, half-weight atoms, suggesting that the group is disordered between two positions related by a mirror plane parallel to (110) and separated by about 0·45 Å; the N–O distances are 1·23 Å (twice) and 1·24 Å and the O–N–O angles 121 and 119° (twice). Nitrate group II is somewhat less satisfactory: the distances are 1·20 (twice) and 1·22 Å and all three angles are 120°, but even assuming twofold disorder we find it necessary to introduce anisotropic temperature factors for the oxygen atoms, implying very large in-plane displacements and, perhaps, additional disorder. The same situation obtains in the μ-O_2 compound (Marsh & Schaefer, 1968), although there nitrate group II was found to have one N–O bond parallel to the c axis rather than parallel to [110].

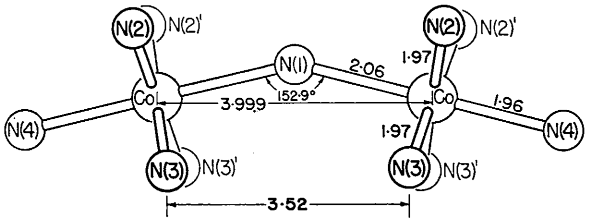

Fig. 2. A drawing of the cation, showing the more important dimensions. Standard deviations in the bond distances are about 0·02 – 0·03 Å.

We have represented nitrate group III by fourfold disorder of isotropic atoms, plus an additional atom (perhaps a water molecule) in one-eighth of the available sites. This is a slightly simpler representation than was proposed for the μ-O_2 compound, where this nitrate group was found to have at least eightfold disorder. It is possible that the model we propose here would not have been as satisfactory had the data been of as high quality as they were for the μ-O_2 compound; crystals of it did not show signs of decomposition, and three complete sets of intensity data were collected.

No analysis for water was made, since its presence was not suspected until the refinement was nearly complete. We did not have enough material to make such an analysis, and its preparation is difficult. Our results suggest that there is approximately one-quarter molecule of water per formula unit in the crystal we used; it is likely that the water content is variable, and is related to the differences in intensity and cell dimensions we find in going from one crystal to another.

We are very grateful to Professor C. Brubaker for providing the crystals.

References

Cromer, D. T. (1965). *Acta Cryst.* **18**, 17.

Duchamp, D. J. (1964). A.C.A. Meeting, Bozeman, Montana, paper B-14, p. 29.

International Tables for X-ray Crystallography (1962). Vol. III. Birmingham: Kynoch Press.

Marsh, R. E. & Schaefer, W. P. (1967). *Acta Cryst.* **B24**, 246.

Stewart, R. F., Davidson, E. R. & Simpson, W. T. (1965). *J. Chem. Phys.* **42**, 3175.

Vannerberg, N.-G. (1963). *Acta Chem. Scand.* **17**, 79.

Acta Cryst. (1968). B**24**, 286

An X-ray study of gel-grown strontium tartrate tetrahydrate

By Joseph Bohandy and John C. Murphy, *Applied Physics Laboratory, The Johns Hopkins University, Silver Spring, Maryland, U.S.A.*

(*Received* 28 *August* 1967)

The space group ($P2_12_12_1$) and unit-cell dimensions ($a=9{\cdot}48\pm0{\cdot}04$, $b=10{\cdot}96\pm0{\cdot}04$, $c=9{\cdot}46\pm0{\cdot}04$ Å) of gel-grown strontium tartrate have been determined by the precession method.

Recently, there has been renewed interest in the growth of crystals in silica gel (Dennis & Henisch, 1967; Henisch, Dennis & Hanoka, 1965). Using this technique, we have grown a large variety of single crystals such as the alkaline earth tartrates and various sulfite, formate, and borate salts. Briefly, the method consists of adding an acid (tartaric acid, for example) to a sodium metasilicate solution. After the mixture has set, an appropriate solution is placed on top