Table 3. *Geometry of the possible hydrogen bonds, distances in* (Å) *and angles in* (°) *with e.s.d.'s in parentheses*

D—H···*A*	*D*···*A*	H···*A*	*D*—H···*A*
N1—H1···Cl(*A*^{i})	3·14 (1)	2·16 (10)	166 (4)
N3—H3···O(1^{i})	2·78 (1)	1·77 (10)	174 (6)
N4—H4···Cl(1^{ii})	3·12 (1)	2·11 (3)	167 (4)
N5—H52···N(5^{iii})	3·48 (1)	2·57 (3)	147 (6)
N7—H71···O(2^{iv})	3·01 (2)	2·05 (19)	164 (11)
N7—H72···Cl(*B*^{v})	3·31 (2)	2·64 (6)	122 (8)
O1—H101···Cl(1^{iv})	3·22 (1)	2·24 (2)	170 (4)
O1—H201···Cl(*B*^{vii})	3·00 (1)	2·33 (6)	130 (5)
O1—H201···Cl(*B*^{viii})	3·27 (1)	2·49 (7)	143 (5)

Symmetry code: (i) $+x, +y, +z-1$; (ii) $+x-\frac{1}{2}, -y, +z-\frac{1}{2}$; (iii) $-x+1, -y, -z-1$; (iv) $-x+\frac{1}{2}, +y, -z+\frac{1}{2}$; (v) $+x-\frac{1}{2}, -y+1, +z-\frac{1}{2}$; (vi) $1-x, 1-y, 1-z$; (vii) $-x, 1-y, 1-z$; (vii) $x-\frac{1}{2}, 1-y, z+\frac{1}{2}$.

The authors are grateful to Dr C. R. Saha and Dr N. K. Roy of the Indian Institute of Technology, Kharagpur, for providing crystals and helpful discussions. They are grateful to Mr S. Chaudhury of RSIC, Bose Institute, for collecting data on the Enraf–Nonius CAD-4 system. They are also grateful to a referee for various helpful suggestions.

References

BERTA, D. A., SPOFFORD, W. A. III, BOLDRINI, P. & AMMA, E. L. (1970). *Inorg. Chem.* **9**, 136–142.
CREITZ, T. C., GSELL, R. & WAMPLER, D. L. (1969). *Chem. Commun.* pp. 1371–1372.
GIRLING, R. L. & AMMA, E. L. (1968). *Chem. Commun.* pp. 1487–1488.
MOUCHARAFIEH, N. C., ELLER, P. G., BERTRAND, J. A. & ROYER, D. J. (1978). *Inorg. Chem.* **17**, 1220–1228.
NARDELLI, M. (1983). *Comput. Chem.* **7**, 95–98.
PAULING, L. (1960). *The Nature of the Chemical Bond*, 3rd ed., p. 253, Ithaca: Cornell Univ. Press.
RAY, P., CHOUDHURY, A. K. (1950). *J. Ind. Chem. Soc.* **27**, 673–675.
ROY, N. K. & SAHA, C. R. (1980). *Ind. J. Chem.* **19A**, 889–892.
SAHA, C. R. & ROY, N. K. (1983). *J. Coord. Chem.* **12**, 163–176.
SHELDRICK, G. M. (1976). *SHELX76*. Program for crystal structure determination. Univ. of Cambridge, England.
VICKERY, B. L., BRIGHT, D. & MALLINSON, P. R. (1971). *XRAYARC*. IBM1130 program system for crystallography modified for the Burroughs B6700 computer.

Acta Cryst. (1990). C**46**, 2068–2070

Structure of Bis-μ-(2-quinolinecarboxylato-*O*,*O*,*O*′)bis[triaqua-(2-quinolinecarboxylato-*N*,*O*)(2-quinolinecarboxylato-*O*)neodymium(III)] Trihydrate

BY P. STARYNOWICZ

Institute of Chemistry, The University, 14 *F. Joliot-Curie Str.*, 50383 *Wroclaw, Poland*

(*Received* 13 *August* 1988; *accepted* 9 *February* 1990)

Abstract. $[\{Nd(C_{10}H_6NO_2)_2(H_2O)_3\}_2(\mu\text{-}C_{10}H_6NO_2)_2].3H_2O$, $M_r = 1483{\cdot}6$, triclinic, $P\bar{1}$, $a = 15{\cdot}760$ (9), $b = 8{\cdot}178$ (6), $c = 24{\cdot}153$ (19) Å, $\alpha = 92{\cdot}54$ (6), $\beta = 99{\cdot}19$ (6), $\gamma = 109{\cdot}40$ (6)°, $V = 2883$ (4) Å^3 [reduced cell: $a = 8{\cdot}178$ (6), $b = 15{\cdot}154$ (12), $c = 24{\cdot}153$ (19) Å, $\alpha = 79{\cdot}05$ (7), $\beta = 87{\cdot}46$ (6), $\gamma = 78{\cdot}80$ (6)°], $Z = 2$, $D_m = 1{\cdot}70$, $D_x = 1{\cdot}709$ (2) Mg m^{-3}, λ(Mo $K\alpha$) = 0·71069 Å, $\mu = 1{\cdot}88$ mm^{-1}, $F(000) = 1488$, $T = 302$ (1) K, final $R = 0{\cdot}047$ for 5110 reflections. The title compound is a dimer; the two Nd ions are bridged by two carboxyl groups. Each Nd ion is surrounded by one N atom, five carboxylic oxygens and three water molecules. Very short Nd—O (carboxyl) bonds [2·320 (7) and 2·325 (7) Å] were found.

Introduction. This work is part of our study on the structures and properties of complexes containing lanthanide–nitrogen bonds.

Experimental. The title compound was prepared by mixing aqueous solutions of $NdCl_3$ and 2-quinolinecarboxylic (quinaldic) acid, and then adding a dilute solution of *N*-2-hydroxyethylpiperazine-*N*′-ethanesulfonic acid (HEPES). After a few hours tiny violet plates were formed. Two specimens (0·3 × 0·4 × 0·5 mm and 0·3 × 0·3 × 0·4 mm) were cut from larger crystals. D_m by flotation in $C_2H_4Br_2/CHCl_3$. Oscillation and Weissenberg photographs showed no symmetry, thus indicating the triclinic system. The structure was successfully refined in space group $P\bar{1}$. Syntex $P2_1$ diffractometer, Mo $K\alpha$ radiation for lattice parameters (14 reflections, $21 < 2\theta < 26°$), variable $\theta/2\theta$ scan, $4 < 2\theta < 45°$, two standards every 100 reflections, maximum variation from means 7·1%, 4541 and 1281 intensities respectively measured from the two specimens, 166 common ones used for determination of the scale ratio between the two sets, $R_{int} = 0{\cdot}028$, after averaging 5110 unique reflec-

0108-2701/90/112068-03$03.00

tions with $I > 3\sigma(I)$, index range h 0→15, k −8→7, l −25→25, no correction for absorption or extinction. Structure was solved with locally modified *XTL/XTLE* programs (Syntex, 1976), and refined with *SHELX*76 (Sheldrick, 1976). Neutral-atom scattering factors from *International Tables for X-ray Crystallography* (1974, Vol. IV), real and imaginary components of anomalous dispersion included for all non-H atoms. The Nd atoms were located from a Patterson map, the remaining non-H atoms from subsequent difference syntheses; C-bonded hydrogens were placed geometrically, water hydrogens from difference syntheses. Final full-matrix least-squares refinement based on F (non-H atoms anisotropic, C-bonded hydrogens with fixed positional parameters and common temperature factor, O-bonded hydrogens with common temperature factor and constrained positional parameters, the constraint refined as an additional parameter), $R = 0{\cdot}047$, $wR = 0{\cdot}044$, maximum $\Delta/\sigma = 0{\cdot}32$, $\Delta\rho$ between $-1{\cdot}16$ and $2{\cdot}38$ e Å^{-3}, the highest peaks around Nd atoms, $w = 1/\sigma^2(F)$.

Discussion. Final atomic parameters are given in Table 1, and the geometry of the coordination environment of the Nd ions is shown in Table 2, together with average bond lengths for the quinaldate residues.* The structure consists of the neutral dimer, bis-μ-(2-quinolinecarboxylato)-bis-[triaquadi(2-quinolinecarboxylato)neodymium(III)], and water of hydration. The *ORTEP* view (Johnson, 1976) of the complex molecule is given in Fig. 1. The Nd1—Nd2 distance is 4·461 (1) Å. The coordination environments of both metal ions are essentially the same. In each half of the dimer the three quinaldate moieties display different modes of coordination to Nd. The *A* (or *F*) moiety is involved in a bidentate carboxyl bridge, in which the two O atoms chelate the metal atom with an additional bond from one of the oxygens to the other metal atom. The *B* (or *D*) moiety is bonded through its nitrogen and one of its oxygens. The *C* (or *E*) moiety is bonded through one of its oxygens only. The distances Nd—N are longer than usually observed (Sinha, 1976), perhaps due to steric interactions within the complex molecule. The same reason may bring about variation of the Nd—O (water) distances. The steric interactions and the mode of coordination (Đào, 1987) may explain the Nd—O(carboxylic) bond length variation. The Nd1—O1*C* and Nd2—O1*E* distances are about

* Lists of structure factors, anisotropic thermal parameters, H-atom parameters and hydrogen-bond geometrical parameters have been deposited with the British Library Document Supply Centre as Supplementary Publication No. SUP 53045 (38 pp.). Copies may be obtained through The Technical Editor, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England.

Table 1. *Final atomic coordinates and equivalent isotropic thermal U factors*

$U_{eq} = \frac{1}{3}\sum U_{ij} a_i^* a_j^* \mathbf{a}_i.\mathbf{a}_j.$

	x	y	z	U_{eq} (Å^2)
Nd1	0·69083 (4)	0·08803 (5)	0·80462 (2)	0·0277 (3)
Nd2	0·89530 (4)	−0·03637 (5)	0·71833 (2)	0·279 (3)
O1*A*	0·8537 (6)	0·1408 (7)	0·8097 (3)	0·046 (3)
O2*A*	0·9877 (5)	0·0981 (8)	0·8121 (2)	0·040 (3)
N*A*	0·9030 (6)	0·2427 (8)	0·9250 (3)	0·033 (4)
C1*A*	0·9315 (9)	0·1388 (10)	0·8358 (4)	0·034 (5)
C2*A*	0·9554 (8)	0·1822 (10)	0·9004 (4)	0·034 (4)
C3*A*	1·0347 (7)	0·1562 (11)	0·9289 (4)	0·036 (4)
C4*A*	1·0550 (7)	0·1930 (12)	0·9864 (4)	0·041 (5)
C5*A*	1·0008 (8)	0·2547 (11)	1·0144 (4)	0·038 (5)
C6*A*	1·0167 (8)	0·2887 (13)	1·0740 (4)	0·049 (5)
C7*A*	0·9617 (10)	0·3455 (13)	1·0994 (4)	0·058 (6)
C8*A*	0·8845 (9)	0·3705 (13)	1·0679 (5)	0·059 (6)
C9*A*	0·8656 (7)	0·3389 (12)	1·0096 (4)	0·046 (5)
C10*A*	0·9229 (7)	0·2774 (10)	0·9832 (4)	0·032 (4)
O1*B*	0·7244 (4)	−0·1621 (7)	0·8390 (2)	0·037 (3)
O2*B*	0·7442 (5)	−0·3411 (8)	0·9019 (3)	0·061 (4)
N*B*	0·6687 (5)	0·0130 (8)	0·9142 (3)	0·034 (3)
C1*B*	0·7228 (7)	−0·2167 (11)	0·8876 (4)	0·038 (5)
C2*B*	0·6939 (6)	−0·1173 (10)	0·9302 (3)	0·029 (4)
C3*B*	0·6926 (7)	−0·1719 (12)	0·9852 (4)	0·042 (5)
C4*B*	0·6641 (8)	−0·0847 (13)	1·0231 (4)	0·050 (5)
C5*B*	0·6355 (7)	0·0537 (11)	1·0081 (4)	0·038 (4)
C6*B*	0·6030 (8)	0·1467 (15)	1·0449 (4)	0·056 (5)
C7*B*	0·5748 (8)	0·2763 (15)	1·0282 (4)	0·058 (6)
C8*B*	0·5763 (8)	0·3233 (12)	0·9736 (4)	0·051 (5)
C9*B*	0·6086 (7)	0·2378 (11)	0·9361 (4)	0·041 (5)
C10*B*	0·6376 (6)	0·0996 (11)	0·9525 (3)	0·034 (4)
O1*C*	0·5449 (5)	−0·1072 (8)	0·8040 (3)	0·042 (3)
O2*C*	0·4355 (5)	−0·3563 (8)	0·7658 (3)	0·061 (4)
N*C*	0·4169 (5)	0·0406 (9)	0·8137 (3)	0·023 (3)
C1*C*	0·4619 (8)	−0·2043 (12)	0·7883 (4)	0·033 (5)
C2*C*	0·3886 (7)	−0·1331 (11)	0·7990 (3)	0·030 (5)
C3*C*	0·2979 (8)	−0·2445 (11)	0·7931 (4)	0·032 (4)
C4*C*	0·2338 (8)	−0·1771 (12)	0·8038 (3)	0·040 (5)
C5*C*	0·2583 (8)	0·0031 (12)	0·8205 (4)	0·038 (5)
C6*C*	0·1962 (8)	0·0853 (14)	0·8311 (4)	0·049 (5)
C7*C*	0·2249 (9)	0·2598 (15)	0·8468 (4)	0·048 (6)
C8*C*	0·3171 (9)	0·3609 (12)	0·8516 (4)	0·044 (5)
C9*C*	0·3793 (8)	0·2890 (12)	0·8410 (4)	0·043 (5)
C10*C*	0·3526 (8)	0·1060 (12)	0·8244 (3)	0·030 (4)
O1*D*	0·8552 (5)	0·2063 (7)	0·6841 (2)	0·039 (3)
O2*D*	0·8242 (5)	0·3779 (9)	0·6221 (3)	0·061 (4)
N*D*	0·8787 (5)	0·0020 (9)	0·6015 (3)	0·035 (3)
C1*D*	0·8420 (7)	0·2491 (11)	0·6349 (4)	0·037 (5)
C2*D*	0·8497 (7)	0·1290 (11)	0·5874 (4)	0·037 (4)
C3*D*	0·8282 (8)	0·1618 (12)	0·5314 (4)	0·054 (5)
C4*D*	0·8356 (8)	0·0569 (13)	0·4891 (4)	0·058 (6)
C5*D*	0·8701 (8)	−0·0763 (12)	0·5021 (4)	0·050 (5)
C6*D*	0·8852 (9)	−0·1852 (14)	0·4602 (4)	0·059 (6)
C7*D*	0·9172 (9)	−0·3109 (15)	0·4747 (5)	0·065 (6)
C8*D*	0·9404 (8)	−0·3367 (12)	0·5321 (5)	0·059 (6)
C9*D*	0·9271 (7)	−0·2332 (11)	0·5725 (4)	0·042 (5)
C10*D*	0·8926 (7)	−0·1023 (11)	0·5593 (3)	0·033 (4)
O1*E*	1·0334 (5)	0·1499 (8)	0·7003 (3)	0·042 (3)
O2*E*	1·1392 (5)	0·4087 (8)	0·7245 (4)	0·074 (4)
N*E*	1·1627 (6)	0·0131 (9)	0·6818 (3)	0·035 (4)
C1*E*	1·1144 (8)	0·2528 (13)	0·7079 (4)	0·036 (5)
C2*E*	1·1887 (8)	0·1831 (11)	0·6964 (3)	0·031 (5)
C3*E*	1·2777 (8)	0·2943 (12)	0·7015 (4)	0·035 (5)
C4*E*	1·3446 (7)	0·2323 (12)	0·6912 (4)	0·039 (5)
C5*E*	1·3204 (8)	0·0536 (13)	0·6735 (4)	0·038 (5)
C6*E*	1·3830 (8)	−0·0254 (15)	0·6626 (4)	0·055 (6)
C7*E*	1·3565 (9)	−0·1983 (17)	0·6468 (4)	0·055 (6)
C8*E*	1·2658 (11)	−0·3010 (14)	0·6411 (4)	0·055 (6)
C9*E*	1·1999 (9)	−0·2353 (12)	0·6525 (4)	0·051 (5)
C10*E*	1·2275 (9)	−0·0507 (12)	0·6699 (3)	0·035 (5)
O1*F*	0·7271 (5)	−0·0986 (7)	0·7167 (2)	0·041 (3)
O2*F*	0·6089 (5)	−0·0018 (9)	0·7030 (3)	0·052 (4)
N*F*	0·6608 (6)	−0·2695 (9)	0·6071 (3)	0·040 (4)
C1*F*	0·6568 (8)	−0·0718 (11)	0·6851 (4)	0·033 (5)
C2*F*	0·6397 (7)	−0·1364 (12)	0·6232 (4)	0·037 (4)
C3*F*	0·6006 (8)	−0·0395 (15)	0·5841 (4)	0·063 (6)
C4*F*	0·5856 (10)	−0·0939 (18)	0·5290 (5)	0·086 (8)
C5*F*	0·6048 (8)	−0·2407 (14)	0·5095 (4)	0·056 (5)
C6*F*	0·5903 (10)	−0·3029 (19)	0·4527 (4)	0·080 (7)
C7*F*	0·6128 (10)	−0·4424 (18)	0·4380 (4)	0·086 (8)
C8*F*	0·6503 (9)	−0·5257 (14)	0·4785 (5)	0·073 (6)
C9*F*	0·6657 (8)	−0·4693 (13)	0·5336 (4)	0·058 (6)
C10*F*	0·6418 (7)	−0·3265 (12)	0·5502 (4)	0·041 (5)
*W*1	0·5840 (4)	0·2454 (7)	0·7970 (3)	0·043 (3)
*W*2	0·7505 (5)	0·3339 (8)	0·7433 (2)	0·046 (3)

Table 1 (*cont.*)

	x	*y*	*z*	U_{eq} (Å^2)
W3	0·7706 (5)	0·3573 (7)	0·8658 (3)	0·041 (3)
W4	0·8496 (5)	−0·2558 (8)	0·7891 (3)	0·042 (3)
W5	1·0021 (5)	−0·1914 (7)	0·7180 (3)	0·042 (3)
W6	0·8088 (5)	−0·3284 (7)	0·6697 (2)	0·040 (3)
W7	0·0066 (5)	0·5096 (8)	0·7538 (3)	0·055 (3)
W8	0·4206 (5)	0·4503 (8)	0·2406 (3)	0·061 (3)
W9	0·5982 (6)	0·3703 (10)	0·6650 (3)	0·080 (4)

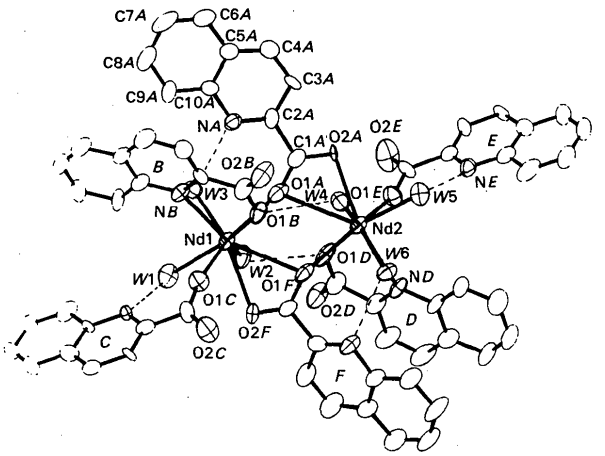

Fig. 1. Molecular diagram of the complex molecule. The numbering scheme of the ring atoms in the moieties *A* through *F* follows the pattern of that for the *A* moiety. The dashed lines represent the intramolecular hydrogen bonds.

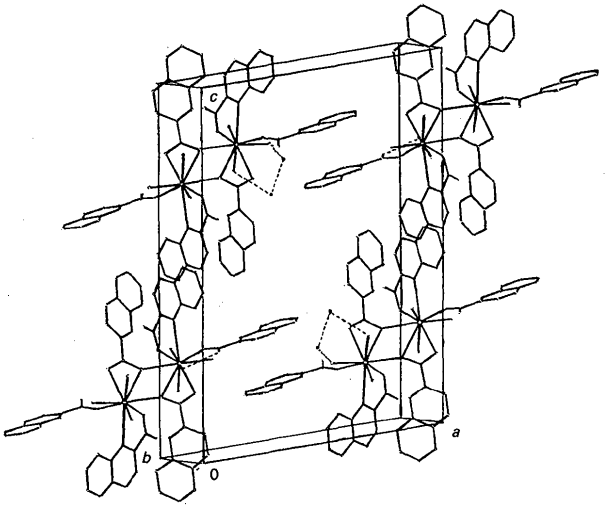

Fig. 2. View of the crystal structure. The dashed lines represent the intermolecular hydrogen bonds.

0·08 Å shorter than the values so far observed in Nd carboxylates (Sinha, 1976; Đào, 1987). The structure is held together by van der Waals interactions, and by a network of intermolecular hydrogen bonds. The crystal packing is shown in Fig. 2.

The author thanks Professor K. Bukietyńska for helpful discussion, and Dr T. Lis for advice and help in performing the measurements. This work was supported by the Polish Academy of Sciences (project CPBP 01.12).

Table 2. *Distances* (Å) *and angles* (°) *for the* Nd *coordination spheres, together with averaged bond lengths* (Å) *in the quinaldate moieties*

Nd1—O1*A*	2·439 (10)	Nd1—O1*B*	2·426 (6)
—N*B*	2·793 (7)	—O1*C*	2·320 (7)
—O1*F*	2·801 (6)	—O2*F*	2·535 (7)
—*W*1	2·426 (6)	—*W*2	2·564 (6)
—*W*3	2·428 (6)		
Nd2—O1*A*	2·866 (8)	Nd2—O2*A*	2·475 (5)
—O1*D*	2·415 (6)	—N*D*	2·832 (7)
—O1*E*	2·325 (7)	—O1*F*	2·521 (8)
—*W*4	2·543 (7)	—*W*5	2·421 (8)
—*W*6	2·453 (5)		

O1*B*—Nd1—O1*A*	71·4 (3)		
N*B*—Nd1—O1*A*	101·7 (3)	N*B*—Nd1—O1*B*	61·6 (3)
O1*C*—Nd1—O1*A*	148·8 (3)	O1*C*—Nd1—O1*B*	78·5 (3)
O1*C*—Nd1—N*B*	69·7 (3)		
O1*F*—Nd1—O1*A*	66·9 (3)	O1*F*—Nd1—O1*B*	70·4 (2)
O1*F*—Nd1—N*B*	131·5 (3)	O1*F*—Nd1—O1*C*	95·7 (3)
O2*F*—Nd1—O1*A*	109·3 (3)	O2*F*—Nd1—O1*B*	106·9 (3)
O2*F*—Nd1—N*B*	141·2 (3)	O2*F*—Nd1—O1*C*	71·7 (3)
O2*F*—Nd1—O1*F*	49·3 (3)		
*W*1—Nd1—O1*A*	140·1 (3)	*W*1—Nd1—O1*B*	145·9 (3)
*W*1—Nd1—N*B*	92·9 (3)	*W*1—Nd1—O1*C*	71·1 (3)
*W*1—Nd1—O1*F*	126·9 (3)	*W*1—Nd1—O2*F*	78·2 (3)
*W*2—Nd1—O1*A*	72·7 (3)	*W*2—Nd1—O1*B*	140·1 (3)
*W*2—Nd1—N*B*	144·3 (3)	*W*2—Nd1—O1*C*	131·8 (3)
*W*2—Nd1—O1*F*	80·0 (2)	*W*2—Nd1—O2*F*	69·6 (3)
*W*2—Nd1—*W*1	73·9 (3)		
*W*3—Nd1—O1*A*	74·0 (3)	*W*3—Nd1—O1*B*	113·9 (3)
*W*3—Nd1—N*B*	73·1 (3)	*W*3—Nd1—O1*C*	127·5 (3)
*W*3—Nd1—O1*F*	136·9 (3)	*W*3—Nd1—O2*F*	137·4 (3)
*W*3—Nd1—*W*1	75·2 (3)		
*W*3—Nd1—*W*2	71·4 (3)		

O2*A*—Nd2—O1*A*	49·0 (3)		
O1*D*—Nd2—O1*A*	71·5 (3)	O1*D*—Nd2—O2*A*	100·4 (3)
N*D*—Nd2—O1*A*	132·3 (3)	N*D*—Nd2—O2*A*	143·4 (3)
N*D*—Nd2—O1*D*	61·2 (3)		
O1*E*—Nd2—O1*A*	105·9 (3)	O1*E*—Nd2—O2*A*	74·8 (3)
O1*E*—Nd2—O1*D*	77·4 (3)	O1*E*—Nd2—N*D*	70·5 (3)
O1*F*—Nd2—O1*A*	64·9 (3)	O1*F*—Nd2—O2*A*	111·4 (3)
O1*F*—Nd2—O1*D*	71·1 (3)	O1*F*—Nd2—N*D*	93·1 (3)
O1*F*—Nd2—O1*E*	148·5 (3)		
*W*4—Nd2—O1*A*	73·2 (3)	*W*4—Nd2—O2*A*	72·0 (3)
*W*4—Nd2—O1*D*	137·9 (3)	*W*4—Nd2—N*D*	143·4 (3)
*W*4—Nd2—O1*E*	135·0 (3)	*W*4—Nd2—O1*F*	73·6 (3)
*W*5—Nd2—O1*A*	130·6 (3)	*W*5—Nd2—O2*A*	84·7 (3)
*W*5—Nd2—O1*D*	144·7 (3)	*W*5—Nd2—N*D*	94·2 (3)
*W*5—Nd2—O1*E*	70·3 (3)	*W*5—Nd2—O1*F*	139·5 (3)
*W*5—Nd2—*W*4	77·0 (3)		
*W*6—Nd2—O1*A*	128·3 (3)	*W*6—Nd2—O2*A*	138·6 (3)
*W*6—Nd2—O1*D*	118·1 (3)	*W*6—Nd2—N*D*	74·1 (3)
*W*6—Nd2—O1*E*	125·8 (3)	*W*6—Nd2—O1*F*	71·1 (3)
*W*6—Nd2—*W*4	69·4 (3)		
*W*6—Nd2—*W*5	72·9 (3)		

	Average	*n*	Min. value	Max. value
C—C*	1·388 (31)	54	1·324 (18)	1·451 (15)
C—C†	1·517 (15)	6	1·499 (13)	1·542 (13)
C—N	1·344 (37)	12	1·297 (15)	1·390 (11)
C—O	1·253 (35)	12	1·206 (14)	1·328 (14)

* Bonds within the aromatic rings.
† C(carboxyl)—C(ring) bonds.

References

ĐÀO, C. N. (1987). PhD Dissertation, Univ. of Wroclaw, Poland.
JOHNSON, C. K. (1976). *ORTEP*II. Report ORNL-5138. Oak Ridge National Laboratory, Tennessee, USA.
SHELDRICK, G. M. (1976). *SHELX*76. Program for crystal structure determination. Univ. of Cambridge, England.
SINHA, S. P. (1976). *Struct. Bonding* (*Berlin*), **25**, 69–154.
Syntex (1976). *XTL/XTLE Structure Determination System.* Syntex Analytical Instruments, Cupertino, California, USA.