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Retraction of articles

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This article reports the retraction of 11 articles published in *Acta Crystallographica Section E* between 2005 and 2009.

After further thorough investigation (see Harrison *et al.*, 2010), 11 additional articles are retracted by the authors or by the journal as a result of problems with the data sets or incorrect atom assignments. Full details of all the articles are given in Table 1.

Table 1
Details of articles to be retracted, in order of publication.

Title	Reference	DOI	Refcode
[N,N′-Bis(2-hydroxynaphthylmethylene)-1,2-ethanediaminato]zinc(II)	Chen *et al.* (2005)	10.1107/S1600536805026796	YAWZOM
Diazidobis(2,2′-biimidazole)copper(II)	Liu *et al.* (2007)	10.1107/S1600536807047873	SILZIX
Dichlorido(1,10-phenanthroline)copper(II)	Liu (2007)	10.1107/S1600536807056735	MISSAJ
Diazidobis(2,2′-biimidazole)cobalt(II)	Li *et al.* (2008)	10.1107/S1600536807062873	MIRYAO
Diazidobis(2,2′-biimidazole)manganese(II)	Zhang *et al.* (2008)	10.1107/S1600536808017984	MODBUD
Diazidobis(2,2′-biimidazole)iron(II)	Hao *et al.* (2008*a*)	10.1107/S1600536808018539	MODFOB
Bis(pentane-2,4-dionato)bis[2-(4-pyridyl)-4,4,5,5-tetramethylimidazoline-1-oxyl 3-oxide]nickel(II)	Hao *et al.* (2008*b*)	10.1107/S1600536808018552	MODFUH
Bis(pentane-2,4-dionato-κ^2O,O')bis[4,4,5,5-tetramethyl-2-(4-pyridyl)imidazoline-1-oxyl 3-oxide-κN^2]manganese(II)	Liu, Zhang *et al.* (2008)	10.1107/S1600536808022952	MODLUN
Bis[2,4-pentanedionato(1−)]bis[4,4,5,5-tetramethyl-2-(4-pyridyl)imidazoline-1-oxyl 3-oxide]manganese(II)	Liu, He *et al.* (2008)	10.1107/S1600536808038440	MODLUN01
Di-μ-chlorido-bis[chlorido(1,10-phenanthroline-κ^2N,N')zinc(II)]	Yang *et al.* (2009)	10.1107/S1600536809014482	JOLBOC
Tris(ethylenediamine)manganese(II) sulfate	Lu (2009)	10.1107/S1600536809034874	YUCZEC

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Chen, G., Zhao, B., Sun, M. & Qi, W. (2005). *Acta Cryst.* E**61**, m1869–m1870.
Hao, L., Mu, C. & Kong, B. (2008*a*). *Acta Cryst.* E**64**, m956.
Hao, L., Mu, C. & Kong, B. (2008*b*). *Acta Cryst.* E**64**, m957.
Harrison, W. T. A., Simpson, J. & Weil, M. (2010). *Acta Cryst.* E**66**, e1–e2.
Li, S., Wang, S.-B., Zhang, F.-L. & Tang, K. (2008). *Acta Cryst.* E**64**, m76.
Liu, Y.-Q. (2007). *Acta Cryst.* E**63**, m2991.
Liu, Y., Dou, J., Li, D. & Zhang, X. (2007). *Acta Cryst.* E**63**, m2661.
Liu, Y., He, Q., Zhang, X., Xue, Z. & Lv, C. (2008). *Acta Cryst.* E**64**, m1604.
Liu, Y., Zhang, X., Xue, Z., He, Q. & Zhang, Y. (2008). *Acta Cryst.* E**64**, m1077.
Lu, J. (2009). *Acta Cryst.* E**65**, m1187.
Yang, X.-M., Leng, Q.-B., Chen, Y., He, Y.-G. & Luo, S.-W. (2009). *Acta Cryst.* E**65**, m567.
Zhang, X., Wei, P. & Li, B. (2008). *Acta Cryst.* E**64**, m934.

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Bis(pentane-2,4-dionato)bis[2-(4-pyridyl)-4,4,5,5-tetramethylimidazoline-1-oxyl 3-oxide]nickel(II)

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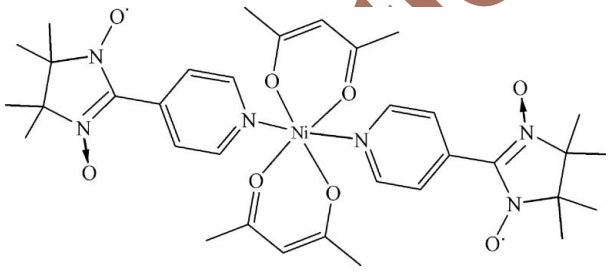
Key indicators: single-crystal X-ray study; T = 293 K; mean σ(C–C) = 0.004 Å; R factor = 0.039; wR factor = 0.101; data-to-parameter ratio = 13.0.

In the title compound, $[Ni(C_5H_7O_2)_2(C_{12}H_{16}N_3O_2)]$, the Ni^{II} cation is hexacoordinated by four O and two N atoms, showing a slightly distorted octahedral geometry. The Ni^{II} cation lies on an inversion centre, as a consequence of which the asymmetric unit comprises one half-molecule. The four O atoms belonging to two pentane-2,4-dionate ligands lie in the equatorial plane and two pyridyl N atoms occupy the axial coordination sites.

Related literature

For related literature, see: Caneschi *et al.* (1989); Tsukuda *et al.* (2002); Vostrikova *et al.* (2000); Kuchar *et al.* (2003).



Experimental

Crystal data

$[Ni(C_5H_7O_2)_2(C_{12}H_{16}N_3O_2)]$
M_r = 725.48
Triclinic, $P\overline{1}$
a = 6.9862 (10) Å
b = 10.121 (3) Å
c = 12.735 (3) Å
α = 98.20 (2)°
β = 103.21 (2)°
γ = 93.08 (2)°
V = 864.1 (3) Å^3
Z = 1
Mo $K\alpha$ radiation
μ = 0.62 mm^{-1}
T = 293 (2) K
0.43 × 0.28 × 0.22 mm

Data collection

Bruker APEXII CCD area-detector diffractometer
Absorption correction: multi-scan (*SADABS*; Bruker, 2001)
T_{min} = 0.776, T_{max} = 0.875
5805 measured reflections
2968 independent reflections
2356 reflections with $I > 2\sigma(I)$
R_{int} = 0.032

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.039
$wR(F^2)$ = 0.101
S = 1.00
2968 reflections
229 parameters
H-atom parameters not refined
$\Delta\rho_{max}$ = 0.38 e Å^{-3}
$\Delta\rho_{min}$ = −0.51 e Å^{-3}

Table 1
Selected geometric parameters (Å, °).

Ni1—O3	2.0239 (17)	Ni1—N1	2.154 (2)
Ni1—O4	2.0292 (16)		
O3^i—Ni1—O3	180	O3—Ni1—N1	88.32 (7)
O3—Ni1—O4	87.77 (7)	O4—Ni1—N1	88.59 (7)
O4^i—Ni1—O4	180	N1—Ni1—N1^i	180

Symmetry code: (i) $-x, -y, -z$.

Data collection: *APEX2* (Bruker, 2004); cell refinement: *SAINT-Plus* (Bruker, 2001); data reduction: *SAINT-Plus*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 2008); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *SHELXTL* (Sheldrick, 2008); software used to prepare material for publication: *SHELXTL*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: KP2176).

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supporting information

Acta Cryst. (2008). E**64**, m957 [doi:10.1107/S1600536808018552]

Bis(pentane-2,4-dionato)bis[2-(4-pyridyl)-4,4,5,5-tetramethylimidazoline-1-oxyl 3-oxide]nickel(II)

Lujiang Hao, Chunhua Mu and Binbin Kong

S1. Comment

Design of different kinds of metal-radical coordination architectures with appropriate organic radicals and coligands has been an important subject during the last decade because of their potential use for molecule-based magnetic materials and optical devices (Caneschi *et al.*, 1989; Tsukuda *et al.*, 2002; Vostrikova *et al.*, 2000; Kuchar *et al.*, 2003). The organic species, such as tridentate nitronyl nitroxide radical, and bidentate nitroxide radical could results in a large number of building blocks with the potential applications. In this paper, we report the structure of the title compound, (I).

The Ni^{II} cation is hexacoordinated with four O and two N atoms showing the slightly distorted octahedral geometry (Fig. 1). The Ni^{II} cation lies on an inversion centre. The four oxygen atoms belonging to two pentane-2,4-dionate lie in the equatorial plane and the two nitrogen atoms occupy the axial coordination sites. The Ni—N and Ni—O bond lengths are in the range of 2.154 (2)–2.154 (2) and 2.0239 (17)–2.0292 (16) /%Å, respectively (Table 1).

S2. Experimental

A mixture of nickel(II) acetylacetonate (1 mmoL) and 2-(4-pyridyl)-4,4,5,5-tetramethylimidazoline-1-oxyl 3-oxide (1 mmoL) in 20 mL methanol was refluxed for several h. The above cooled solution was filterated and the filtrate was kept in the ice box. One week later, green blocks of (I) were obtained with yield of *ca* 3%. Anal. Calc. for $C_{34}H_{46}N_6NiO_8$: C 56.24, H 6.34, N 11.58%; Found: C 56.19, H 6.28, N 11.47%.

S3. Refinement

All H atoms were placed in calculated positions with C—H = 0.93Å and refined as riding with $U_{iso}(H) = 1.2U_{eq}$(carrier).

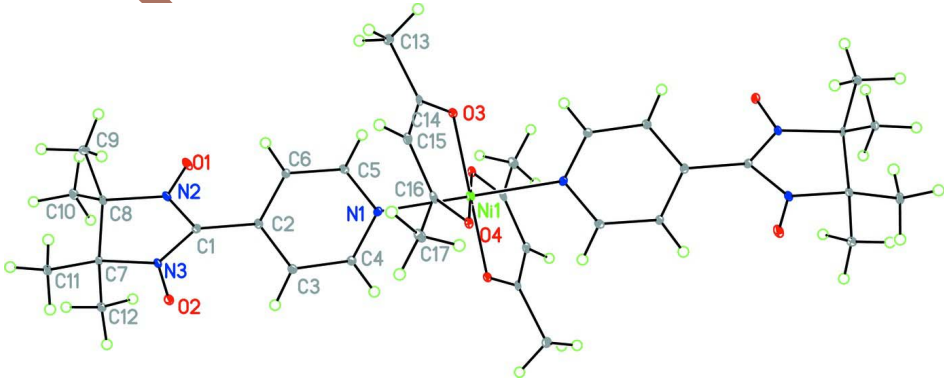

Figure 1

The molecular structure of (I) around Ni^{II}, drawn with the 30% probability displacement ellipsoids for the non-hydrogen atoms.

Bis(pentane-2,4-dionato)bis[2-(4-pyridyl)-4,4,5,5-tetramethylimidazoline-1- oxyl-3-oxide]nickel(II)

Crystal data

$[Ni(C_5H_7O_2)_2(C_{12}H_{16}N_3O_2)]$
$M_r = 725.48$
Triclinic, $P\overline{1}$
Hall symbol: -P 1
$a = 6.9862$ (10) Å
$b = 10.121$ (3) Å
$c = 12.735$ (3) Å
$\alpha = 98.20$ (2)°
$\beta = 103.21$ (2)°
$\gamma = 93.08$ (2)°
$V = 864.1$ (3) Å^3
$Z = 1$
$F(000) = 384$
$D_x = 1.394$ Mg m^{-3}
Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Cell parameters from 2968 reflections
$\theta = 3.1$–25.0°
$\mu = 0.62$ mm^{-1}
$T = 293$ K
Block, green
0.43 × 0.28 × 0.22 mm

Data collection

Bruker APEXII CCD area-detector diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
φ and ω scans
Absorption correction: multi-scan (*SADABS*; Bruker, 2001)
$T_{min} = 0.776$, $T_{max} = 0.876$
5805 measured reflections
2968 independent reflections
2356 reflections with $I > 2\sigma(I)$
$R_{int} = 0.032$
$\theta_{max} = 25.0°$, $\theta_{min} = 3.1°$
$h = -6 \rightarrow 8$
$k = -12 \rightarrow 12$
$l = -11 \rightarrow 15$

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)] = 0.039$
$wR(F^2) = 0.101$
$S = 1.01$
2968 reflections
229 parameters
0 restraints
Primary atom site location: structure-invariant direct methods
Secondary atom site location: difference Fourier map
Hydrogen site location: inferred from neighbouring sites
H-atom parameters not refined
$w = 1/[\sigma^2(F_o^2) + (0.0577P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max} < 0.001$
$\Delta\rho_{max} = 0.38$ e Å^{-3}
$\Delta\rho_{min} = -0.51$ e Å^{-3}

Special details

Geometry. All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Refinement. Refinement of F^2 against ALL reflections. The weighted R-factor wR and goodness of fit S are based on F^2, conventional R-factors R are based on F, with F set to zero for negative F^2. The threshold expression of $F^2 > \sigma(F^2)$ is used only for calculating R-factors(gt) *etc*. and is not relevant to the choice of reflections for refinement. R-factors based on F^2 are statistically about twice as large as those based on F, and R- factors based on ALL data will be even larger.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2)

	x	y	z	U_{iso}*/U_{eq}
Ni1	0.0000	0.0000	0.0000	0.01842 (16)
C1	0.6315 (4)	0.1982 (3)	0.4503 (2)	0.0171 (5)
C2	0.4941 (4)	0.1511 (2)	0.3460 (2)	0.0157 (5)

C3	0.5524 (4)	0.0953 (3)	0.2533 (2)	0.0182 (5)
H3	0.6852	0.0863	0.2562	0.022*
C4	0.4134 (4)	0.0538 (2)	0.1578 (2)	0.0169 (5)
H4	0.4551	0.0175	0.0965	0.020*
C5	0.1699 (4)	0.1168 (2)	0.2385 (2)	0.0163 (5)
H5	0.0360	0.1243	0.2334	0.020*
C6	0.2972 (3)	0.1614 (2)	0.33692 (19)	0.0159 (5)
H6	0.2511	0.1980	0.3967	0.019*
C7	0.9190 (3)	0.2686 (2)	0.58605 (18)	0.0148 (5)
C8	0.7425 (4)	0.2983 (3)	0.6346 (2)	0.0181 (5)
C9	0.6895 (4)	0.4438 (3)	0.6355 (2)	0.0260 (6)
H9A	0.6955	0.4711	0.5671	0.039*
H9B	0.7816	0.5013	0.6938	0.039*
H9C	0.5585	0.4500	0.6462	0.039*
C10	0.7513 (4)	0.2543 (3)	0.7443 (2)	0.0232 (6)
H10A	0.6333	0.2747	0.7674	0.035*
H10B	0.8640	0.3008	0.7971	0.035*
H10C	0.7623	0.1595	0.7378	0.035*
C11	1.0773 (3)	0.3828 (3)	0.6102 (2)	0.0186 (6)
H11A	1.1758	0.3599	0.5708	0.028*
H11B	1.1372	0.3998	0.6872	0.028*
H11C	1.0201	0.4616	0.5882	0.028*
C12	1.0024 (4)	0.1370 (3)	0.6126 (2)	0.0186 (5)
H12A	0.8965	0.0672	0.5967	0.028*
H12B	1.0684	0.1480	0.6886	0.028*
H12C	1.0945	0.1133	0.5690	0.028*
C13	−0.1318 (4)	0.3856 (3)	0.1296 (2)	0.0236 (6)
H13A	−0.2720	0.3832	0.1017	0.035*
H13B	−0.0716	0.4731	0.1295	0.035*
H13C	−0.1042	0.3661	0.2028	0.035*
C14	−0.0496 (4)	0.2828 (2)	0.05844 (19)	0.0169 (5)
C15	0.1142 (4)	0.3210 (2)	0.0228 (2)	0.0193 (6)
H15	0.1681	0.4094	0.0447	0.023*
C16	0.2042 (4)	0.2369 (2)	−0.0434 (2)	0.0183 (6)
C17	0.3724 (4)	0.2937 (3)	−0.0815 (2)	0.0257 (6)
H17A	0.4877	0.2489	−0.0560	0.039*
H17B	0.3981	0.3877	−0.0531	0.039*
H17C	0.3400	0.2812	−0.1599	0.039*
N1	0.2240 (3)	0.06298 (19)	0.14880 (16)	0.0147 (4)
N2	0.5853 (3)	0.2130 (2)	0.54884 (17)	0.0188 (5)
N3	0.8188 (3)	0.2419 (2)	0.46714 (16)	0.0154 (5)
O1	0.4272 (2)	0.1725 (2)	0.56916 (14)	0.0276 (5)
O2	0.9117 (2)	0.25109 (18)	0.39294 (14)	0.0212 (4)
O3	−0.1365 (2)	0.16536 (16)	0.03800 (13)	0.0173 (4)
O4	0.1568 (2)	0.11205 (17)	−0.07687 (13)	0.0183 (4)

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Ni1	0.0180 (3)	0.0196 (3)	0.0157 (3)	0.00152 (18)	0.00049 (19)	0.00216 (19)
C1	0.0170 (13)	0.0237 (14)	0.0112 (13)	0.0031 (10)	0.0052 (10)	0.0011 (10)
C2	0.0157 (13)	0.0186 (13)	0.0127 (13)	0.0000 (10)	0.0026 (10)	0.0040 (10)
C3	0.0149 (13)	0.0234 (14)	0.0164 (14)	0.0020 (10)	0.0039 (11)	0.0028 (11)
C4	0.0173 (13)	0.0198 (13)	0.0143 (13)	0.0030 (10)	0.0041 (10)	0.0039 (10)
C5	0.0133 (12)	0.0192 (13)	0.0180 (14)	0.0022 (10)	0.0045 (10)	0.0069 (10)
C6	0.0166 (13)	0.0217 (13)	0.0100 (13)	0.0024 (10)	0.0039 (10)	0.0026 (10)
C7	0.0139 (12)	0.0242 (14)	0.0047 (12)	0.0012 (10)	0.0009 (10)	0.0000 (10)
C8	0.0134 (13)	0.0279 (15)	0.0114 (13)	0.0040 (10)	0.0003 (10)	0.0018 (11)
C9	0.0217 (14)	0.0332 (16)	0.0218 (15)	0.0111 (12)	0.0025 (11)	0.0012 (12)
C10	0.0186 (14)	0.0393 (17)	0.0112 (14)	0.0027 (11)	0.0023 (11)	0.0046 (12)
C11	0.0155 (13)	0.0246 (14)	0.0144 (14)	0.0020 (10)	0.0016 (10)	0.0017 (11)
C12	0.0148 (13)	0.0241 (14)	0.0170 (14)	0.0024 (10)	0.0039 (10)	0.0034 (11)
C13	0.0270 (15)	0.0192 (14)	0.0214 (15)	0.0067 (11)	0.0002 (11)	0.0001 (11)
C14	0.0179 (13)	0.0193 (14)	0.0094 (13)	0.0045 (10)	−0.0062 (10)	0.0029 (10)
C15	0.0221 (14)	0.0155 (13)	0.0168 (14)	0.0003 (10)	−0.0029 (11)	0.0035 (10)
C16	0.0165 (13)	0.0207 (14)	0.0144 (13)	−0.0002 (10)	−0.0061 (10)	0.0087 (10)
C17	0.0190 (14)	0.0257 (15)	0.0308 (16)	−0.0023 (11)	0.0009 (12)	0.0093 (12)
N1	0.0183 (11)	0.0148 (11)	0.0113 (11)	0.0021 (8)	0.0037 (9)	0.0019 (8)
N2	0.0099 (11)	0.0332 (13)	0.0128 (12)	0.0012 (9)	0.0023 (9)	0.0030 (9)
N3	0.0096 (10)	0.0243 (12)	0.0112 (11)	−0.0003 (8)	0.0012 (9)	0.0014 (8)
O1	0.0109 (9)	0.0545 (13)	0.0181 (10)	−0.0025 (8)	0.0046 (8)	0.0083 (9)
O2	0.0145 (9)	0.0369 (11)	0.0126 (9)	0.0002 (8)	0.0058 (7)	0.0010 (8)
O3	0.0157 (9)	0.0184 (9)	0.0159 (9)	0.0034 (7)	−0.0005 (7)	0.0022 (7)
O4	0.0172 (9)	0.0214 (10)	0.0140 (9)	−0.0006 (7)	−0.0002 (7)	0.0027 (7)

Geometric parameters (Å, º)

Ni1—O3^{i}	2.0239 (17)	C9—H9B	0.9600
Ni1—O3	2.0239 (17)	C9—H9C	0.9600
Ni1—O4^{i}	2.0292 (16)	C10—H10A	0.9600
Ni1—O4	2.0292 (16)	C10—H10B	0.9600
Ni1—N1	2.154 (2)	C10—H10C	0.9600
Ni1—N1^{i}	2.154 (2)	C11—H11A	0.9600
C1—N3	1.318 (3)	C11—H11B	0.9600
C1—N2	1.355 (3)	C11—H11C	0.9600
C1—C2	1.450 (3)	C12—H12A	0.9600
C2—C6	1.364 (3)	C12—H12B	0.9600
C2—C3	1.390 (4)	C12—H12C	0.9600
C3—C4	1.366 (4)	C13—C14	1.506 (3)
C3—H3	0.9300	C13—H13A	0.9600
C4—N1	1.312 (3)	C13—H13B	0.9600
C4—H4	0.9300	C13—H13C	0.9600
C5—N1	1.337 (3)	C14—O3	1.269 (3)
C5—C6	1.361 (3)	C14—C15	1.380 (4)

C5—H5	0.9300	C15—C16	1.388 (4)
C6—H6	0.9300	C15—H15	0.9300
C7—N3	1.495 (3)	C16—O4	1.275 (3)
C7—C11	1.503 (3)	C16—C17	1.488 (3)
C7—C8	1.526 (3)	C17—H17A	0.9600
C7—C12	1.533 (3)	C17—H17B	0.9600
C8—N2	1.491 (3)	C17—H17C	0.9600
C8—C10	1.515 (3)	N2—O1	1.252 (3)
C8—C9	1.537 (4)	N3—O2	1.273 (3)
C9—H9A	0.9600		

O3^{i}—Ni1—O3	180.00 (12)	C8—C10—H10A	109.5
O3^{i}—Ni1—O4^{i}	87.77 (7)	C8—C10—H10B	109.5
O3—Ni1—O4^{i}	92.23 (7)	H10A—C10—H10B	109.5
O3^{i}—Ni1—O4	92.23 (7)	C8—C10—H10C	109.5
O3—Ni1—O4	87.77 (7)	H10A—C10—H10C	109.5
O4^{i}—Ni1—O4	180.00 (9)	H10B—C10—H10C	109.5
O3^{i}—Ni1—N1	91.68 (7)	C7—C11—H11A	109.5
O3—Ni1—N1	88.33 (7)	C7—C11—H11B	109.5
O4^{i}—Ni1—N1	91.41 (7)	H11A—C11—H11B	109.5
O4—Ni1—N1	88.59 (7)	C7—C11—H11C	109.5
O3^{i}—Ni1—N1^{i}	88.32 (7)	H11A—C11—H11C	109.5
O3—Ni1—N1^{i}	91.67 (7)	H11B—C11—H11C	109.5
O4^{i}—Ni1—N1^{i}	88.59 (7)	C7—C12—H12A	109.5
O4—Ni1—N1^{i}	91.41 (7)	C7—C12—H12B	109.5
N1—Ni1—N1^{i}	180.00 (8)	H12A—C12—H12B	109.5
N3—C1—N2	107.4 (2)	C7—C12—H12C	109.5
N3—C1—C2	127.1 (2)	H12A—C12—H12C	109.5
N2—C1—C2	125.4 (2)	H12B—C12—H12C	109.5
C6—C2—C3	117.6 (2)	C14—C13—H13A	109.5
C6—C2—C1	119.1 (2)	C14—C13—H13B	109.5
C3—C2—C1	123.3 (2)	H13A—C13—H13B	109.5
C4—C3—C2	119.6 (2)	C14—C13—H13C	109.5
C4—C3—H3	120.2	H13A—C13—H13C	109.5
C2—C3—H3	120.2	H13B—C13—H13C	109.5
N1—C4—C3	123.0 (2)	O3—C14—C15	125.1 (2)
N1—C4—H4	118.5	O3—C14—C13	116.2 (2)
C3—C4—H4	118.5	C15—C14—C13	118.7 (2)
N1—C5—C6	124.5 (2)	C14—C15—C16	124.7 (2)
N1—C5—H5	117.8	C14—C15—H15	117.7
C6—C5—H5	117.8	C16—C15—H15	117.7
C5—C6—C2	118.5 (2)	O4—C16—C15	126.3 (2)
C5—C6—H6	120.7	O4—C16—C17	114.7 (2)
C2—C6—H6	120.7	C15—C16—C17	118.9 (2)
N3—C7—C11	110.84 (19)	C16—C17—H17A	109.5
N3—C7—C8	100.11 (18)	C16—C17—H17B	109.5
C11—C7—C8	114.5 (2)	H17A—C17—H17B	109.5
N3—C7—C12	105.69 (19)	C16—C17—H17C	109.5

C11—C7—C12	112.2 (2)	H17A—C17—H17C	109.5
C8—C7—C12	112.4 (2)	H17B—C17—H17C	109.5
N2—C8—C7	98.88 (19)	C4—N1—C5	116.8 (2)
N2—C8—C10	109.8 (2)	C4—N1—Ni1	124.33 (16)
C7—C8—C10	115.3 (2)	C5—N1—Ni1	118.92 (16)
N2—C8—C9	106.9 (2)	O1—N2—C1	127.2 (2)
C7—C8—C9	113.5 (2)	O1—N2—C8	121.2 (2)
C10—C8—C9	111.4 (2)	C1—N2—C8	111.4 (2)
C8—C9—H9A	109.5	O2—N3—C1	125.5 (2)
C8—C9—H9B	109.5	O2—N3—C7	122.47 (18)
H9A—C9—H9B	109.5	C1—N3—C7	111.82 (19)
C8—C9—H9C	109.5	C14—O3—Ni1	122.70 (15)
H9A—C9—H9C	109.5	C16—O4—Ni1	121.69 (15)
H9B—C9—H9C	109.5		

Symmetry code: (i) $-x, -y, -z$.