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# *catena*-Poly[[(8-aminoquinoline)cobalt(II)]-di-$\mu$-azido]

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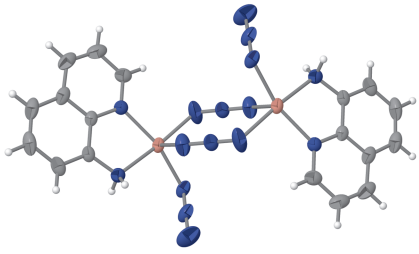
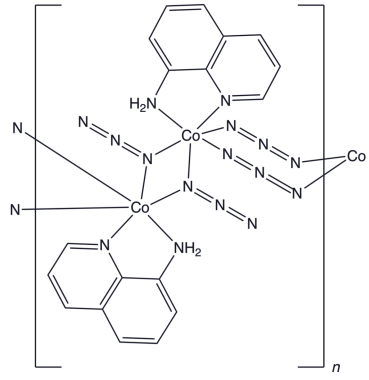
**Structural data:** full structural data are available from iucrdata.iucr.org

The title coordination polymer, $[Co(N_3)_2(C_9H_8N_2)]_n$, was synthesized solvothermally. The $Co^{II}$ atom exhibits a distorted octahedral $[CoN_6]$ coordination geometry with a bidentate 8-aminoquinoline ligand and four azide ligands. Bridging azide ligands result in chains extending along [100]. N—H···N hydrogen bonds join the chains to give an extended structure with sheets parallel to (002).

3D view



Chemical scheme




## Structure description

Pseudohalide and polynitrile compounds derived from transition-metal ions are of great interest from the perspective of their magnetic properties, rich molecular architectures and for their topologies (Atmani *et al.*, 2008; Benmansour *et al.*, 2008, 2010, 2012; Addala *et al.*, 2015; Setifi *et al.*, 2018, 2019; Dmitrienko *et al.*, 2020; Yuste *et al.*, 2009; Merabet *et al.*, 2022).

One of the pseudohalide ligands that has received much attention in the last decade is the azide $[N_3^-]$ ion, partly due to its ability to produce a wide variety of coordination compounds with different nuclearities ranging from simple mononuclear to polynuclear species. Different bonding modes are observed with the azide ion, which result in the formation of one-, two- and three-dimensional polymeric assemblies (Escuer *et al.*, 2006).

As a part of our continuing study of the structural and magnetic properties of transition-metal complexes containing both azide and polypyridyl units (Setifi, Ghazzali *et al.*, 2016; Setifi, Knaust *et al.*, 2016; Setifi, Moon *et al.*, 2016; Benamara *et al.*, 2021; Merabet *et al.*, 2023; Setifi, Setifi *et al.*, 2022, 2023), we report herein the crystal and molecular structure of a one-dimensional coordination polymer, (I), based on 8-aminoquinoline (8-aquin) as co-ligand and the azide anion as ligand with two different coordination modes.

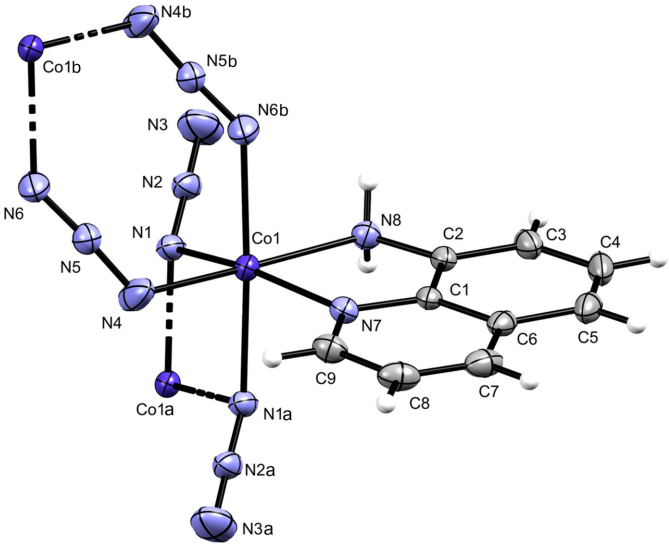



**Figure 1**
Representation of (the title compound showing the atom-labeling scheme. Non-H atom anisotropic displacement parameters are represented at the 50% probability level. Symmetry codes: (*a*) $-x$, $-y+1$, $-z+1$; (*b*) $-x+1$, $-y+1$, $-z+1$.

The asymmetric unit of (I) is composed of a $Co^{II}$ ion, a bidentate 8-aquin ligand and two azide ligands. The distorted octahedral coordination sphere is completed by two additional azide ligands. One of the azide anions binds to two Co centers in a 1,3 bidentate mode, whereas the other one connects two Co centers in a 1,1 bidentate mode. The resulting coordination geometry and supramolecular association is shown in Fig. 1. Pertinent Co—N bond lengths are exhibited in Table 1.

The bridging ligands result in polymeric chains extending parallel to [100], as shown in Fig. 2. The chains are composed of $Co^{II}$ ions joined by alternating bis $\mu$-(1,1-$N_3$) units and bis $\mu$-(1,3-$N_3$) units with corresponding Co···Co separations of 3.2817 (5) and 5.2427 (7) Å, respectively. The angle between the $(N_3)_2$ mean plane of the double *end-to-end* azide bridges and the plane defined by the $Co^{II}$ and the bonded $N_{azide}$ atom is 20.20 (14)°, corresponding to a flattened chair configuration for the eight-membered ring. For a flat bridge, an angle of 0° would be observed. This angle compares to values of 8.2 (2) and 25.6 (1)° for the structurally similarly bridged polymorphic $Fe^{II}$ complexes with a 5,5′-dimethyl-2,2′-bipyridine ligand (Setifi, Bernès *et al.*, 2022). In the 8-acquin complexes of $Mn^{II}$ and $Co^{II}$, the comparable angles are 20.3 (6)° and 25.5 (4)°, respectively (Benamara *et al.*, 2021).

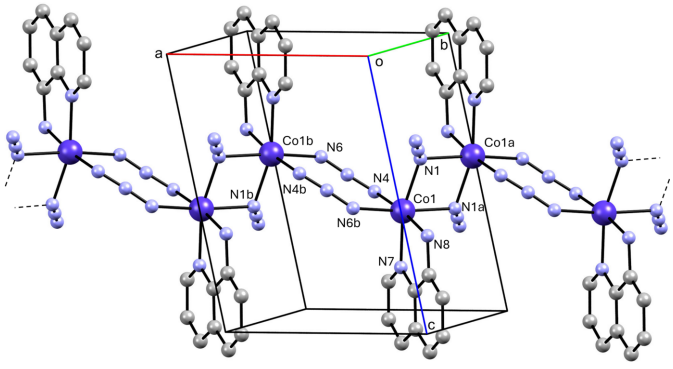



**Figure 2**
Partial packing diagram showing the polymeric chain parallel to [100]. H atoms are not shown. Symmetry codes: (*a*) $-x$, $-y+1$, $-z+1$; (*b*) $-x+1$, $-y+1$, $-z+1$.

**Table 1**
Selected bond lengths (Å).

| | | | |
|---|---|---|---|
| Co1—N1 | 2.1020 (13) | Co1—N8 | 2.1684 (13) |
| Co1—N7 | 2.1100 (12) | Co1—N6$^{i}$ | 2.1685 (15) |
| Co1—N4 | 2.1222 (17) | Co1—N1$^{ii}$ | 2.2047 (12) |

Symmetry codes: (i) $-x+1$, $-y+1$, $-z+1$; (ii) $-x$, $-y+1$, $-z+1$.

**Table 2**
Hydrogen-bond geometry (Å, °).

| *D*—H···*A* | *D*—H | H···*A* | *D*···*A* | *D*—H···*A* |
|---|---|---|---|---|
| N8—H8*A*···N3$^{iii}$ | 0.84 (3) | 2.46 (3) | 3.218 (2) | 151 (2) |
| N8—H8*B*···N4$^{ii}$ | 0.88 (3) | 2.73 (3) | 3.502 (3) | 148 (2) |

Symmetry codes: (ii) $-x$, $-y+1$, $-z+1$; (iii) $-x$, $-y$, $-z+1$.

N—H···N hydrogen-bonding interactions are observed in the extended structure (Table 2, Fig. 3). Within individual chains, $R_2^2(8)$ hydrogen-bonded rings are observed (Fig. 4). The polymeric chains are joined by hydrogen-bonding bridges involving the 8-amino substituent on the quinoline ligands and the terminal nitrogen atom of the $\mu$-(1,1-azide) ligands of adjacent chains, resulting in sheets parallel to (002) containing N—H···N hydrogen-bond-derived $R_2^2(12)$ interchain rings, as seen in Figs. 3 and 5.

## Synthesis and crystallization

The title compound was prepared solvothermally under autogenous pressure from a mixture of cobalt(II) sulfate heptahydrate (28 mg, 0.1 mmol), 8-aminoquinoline (14 mg,

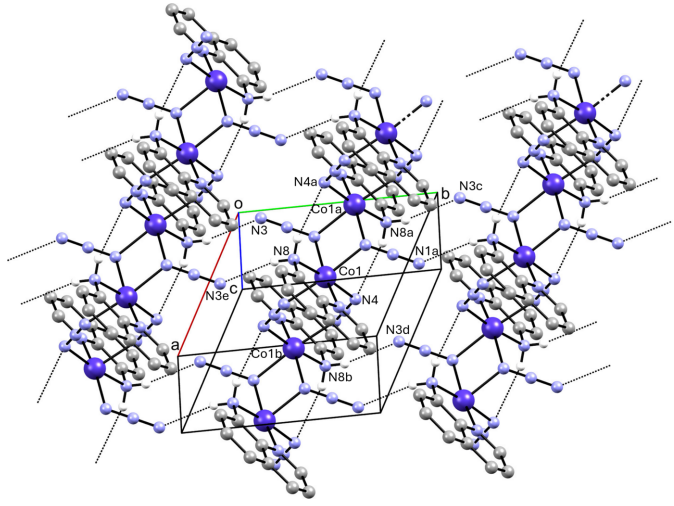



**Figure 3**
Partial packing diagram showing sheets parallel to (002) formed by N—H···N bonds. Only H atoms involved in the interactions are represented. Symmetry codes: (*a*) $-x$, $-y+1$, $-z+1$; (*b*) $-x+1$, $-y+1$, $-z+1$; (*c*) $x$, $y+1$, $z$; (*d*) $x+1$, $y+1$, $z$; (*e*). $-x$, $-y$, $-z+1$.

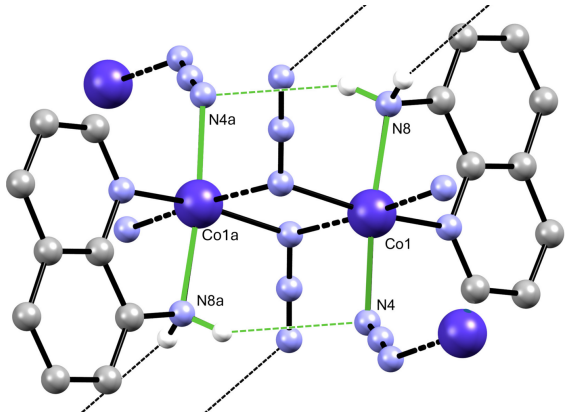



**Figure 4**
View of the intrachain $R_2^2(8)$ N—H···N motif. Only H atoms involved in the hydrogen bonds are shown. Symmetry code: (*a*) $-x, -y+1, -z+1$.

0.1 mmol) and sodium azide (13 mg, 0.2 mmol) in a mixture of water and ethanol (3:1 *v*/*v*, 20 ml). This mixture was sealed in a Teflon-lined autoclave and held at 393 K for 2 days, and then cooled to ambient temperature at a rate of 10 K $h^{-1}$ to give the product (yield 38%).

## Refinement

Crystal data, data collection and refinement details are summarized in Table 3.

**Table 3**
Experimental details.

| | |
|---|---|
| Crystal data | |
| Chemical formula | $[Co(N_3)_2(C_9H_8N_2)]$ |
| $M_r$ | 287.16 |
| Crystal system, space group | Triclinic, $P\overline{1}$ |
| Temperature (K) | 301 |
| $a, b, c$ (Å) | 7.3526 (10), 8.3354 (13), 10.4053 (17) |
| $\alpha, \beta, \gamma$ (°) | 97.221 (6), 102.413 (6), 111.334 (5) |
| $V$ (Å$^3$) | 565.36 (15) |
| $Z$ | 2 |
| Radiation type | Mo $K\alpha$ |
| $\mu$ (mm$^{-1}$) | 1.51 |
| Crystal size (mm) | 0.35 × 0.30 × 0.22 |
| Data collection | |
| Diffractometer | Xcalibur CCD Sapphire3 |
| Absorption correction | Multi-scan (*CrysAlis PRO*; Agilent, 2014) |
| $T_{min}$, $T_{max}$ | 0.769, 1.000 |
| No. of measured, independent and observed [$I > 2\sigma(I)$] reflections | 29909, 4356, 3882 |
| $R_{int}$ | 0.033 |
| (sin $\theta/\lambda)_{max}$ (Å$^{-1}$) | 0.773 |
| Refinement | |
| $R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, $S$ | 0.031, 0.088, 1.06 |
| No. of reflections | 4356 |
| No. of parameters | 171 |
| H-atom treatment | H atoms treated by a mixture of independent and constrained refinement |
| $\Delta\rho_{max}$, $\Delta\rho_{min}$ (e Å$^{-3}$) | 0.72, −0.33 |

Computer programs: *CrysAlis CCD* and *CrysAlis RED* (Oxford Diffraction, 2009), *SHELXS97* (Sheldrick, 2008), *SHELXL2014/7* (Sheldrick, 2015), *ShelXle* (Hübschle *et al.*, 2011) and *publCIF* (Westrip, 2010).

## Acknowledgements

The Service Commun de Diffraction *X* of the Université de Brest is thanked for the single-crystal X-ray crystallographic data collection and analysis.

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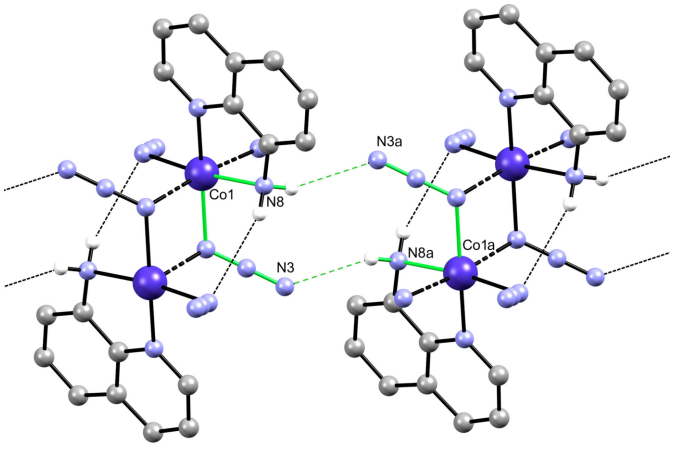


**Figure 5**
View of the interchain $R_2^2(12)$ N—H···N motif. Only H atoms involved in hydrogen bonding are shown. Symmetry code: (*a*) $-x, -y, -z+1$.

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# full crystallographic data

*IUCrData* (2024). **9**, x240849 [https://doi.org/10.1107/S2414314624008496]

## *catena*-Poly[[(8-aminoquinoline)cobalt(II)]-di-$\mu$-azido]

**Fatima Setifi, Zouaoui Setifi, David K. Geiger, Mohammed Hadi Al-Douh and Abderezak Addala**

***catena*-Poly[[(8-aminoquinoline)cobalt(II)]-di-$\mu$-azido-$\kappa^4N^1$:$N^3$-[(8-aminoquinoline)cobalt(II)]-di-$\mu$-azido-$\kappa^4N^1$:$N^1$]**

*Crystal data*

$[Co(N_3)_2(C_9H_8N_2)]$
$M_r$ = 287.16
Triclinic, $P\overline{1}$
$a$ = 7.3526 (10) Å
$b$ = 8.3354 (13) Å
$c$ = 10.4053 (17) Å
$\alpha$ = 97.221 (6)°
$\beta$ = 102.413 (6)°
$\gamma$ = 111.334 (5)°
$V$ = 565.36 (15) Å$^3$
$Z$ = 2
$F(000)$ = 290
$D_x$ = 1.687 Mg m$^{-3}$
Mo $K\alpha$ radiation, $\lambda$ = 0.71073 Å
Cell parameters from 4847 reflections
$\theta$ = 4.2–32.3°
$\mu$ = 1.51 mm$^{-1}$
$T$ = 301 K
Block, purple
0.35 × 0.30 × 0.22 mm

*Data collection*

Xcalibur CCD, Sapphire3 diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
$\omega$ scans
Absorption correction: multi-scan (CrysAlis PRO; Agilent, 2014)
$T_{min}$ = 0.769, $T_{max}$ = 1.000
29909 measured reflections
4356 independent reflections
3882 reflections with $I > 2\sigma(I)$
$R_{int}$ = 0.033
$\theta_{max}$ = 33.3°, $\theta_{min}$ = 2.7°
$h$ = −11→11
$k$ = −12→12
$l$ = −16→16

*Refinement*

Refinement on $F^2$
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)]$ = 0.031
$wR(F^2)$ = 0.088
$S$ = 1.06
4356 reflections
171 parameters
0 restraints
Hydrogen site location: mixed
H atoms treated by a mixture of independent and constrained refinement
$w = 1/[\sigma^2(F_o^2) + (0.0409P)^2 + 0.1945P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max}$ = 0.001
$\Delta\rho_{max}$ = 0.72 e Å$^{-3}$
$\Delta\rho_{min}$ = −0.33 e Å$^{-3}$

*Special details*

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

**Refinement**. H atoms bonded to C were refined using a riding model, H atoms bonded to N were freely refined.

*Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²)*

| | *x* | *y* | *z* | $U_{iso}$*/$U_{eq}$ |
|---|---|---|---|---|
| Co1 | 0.19673 (3) | 0.48517 (2) | 0.59913 (2) | 0.03117 (6) |
| N1 | 0.0070 (2) | 0.37549 (18) | 0.40029 (12) | 0.0377 (3) |
| N2 | −0.0569 (3) | 0.21922 (19) | 0.35544 (13) | 0.0432 (3) |
| N3 | −0.1176 (4) | 0.0705 (2) | 0.3110 (2) | 0.0744 (6) |
| N4 | 0.4085 (3) | 0.7020 (2) | 0.5489 (2) | 0.0668 (6) |
| N5 | 0.5181 (2) | 0.68214 (18) | 0.48714 (14) | 0.0386 (3) |
| N6 | 0.6244 (3) | 0.6686 (2) | 0.42249 (18) | 0.0515 (4) |
| N7 | 0.30637 (18) | 0.58191 (15) | 0.81040 (12) | 0.0309 (2) |
| N8 | 0.0067 (2) | 0.26670 (17) | 0.66848 (13) | 0.0351 (2) |
| H8A | 0.023 (4) | 0.175 (3) | 0.642 (2) | 0.057 (7)* |
| H8B | −0.122 (4) | 0.246 (4) | 0.635 (3) | 0.069 (8)* |
| C1 | 0.2139 (2) | 0.47062 (17) | 0.88451 (13) | 0.0291 (2) |
| C2 | 0.0569 (2) | 0.30410 (18) | 0.81392 (14) | 0.0313 (2) |
| C3 | −0.0357 (3) | 0.1882 (2) | 0.88582 (19) | 0.0423 (3) |
| H3 | −0.1379 | 0.0784 | 0.8402 | 0.051* |
| C4 | 0.0224 (3) | 0.2336 (3) | 1.0283 (2) | 0.0528 (5) |
| H4 | −0.0415 | 0.153 | 1.0754 | 0.063* |
| C5 | 0.1714 (3) | 0.3946 (3) | 1.09811 (17) | 0.0485 (4) |
| H5 | 0.2072 | 0.4232 | 1.192 | 0.058* |
| C6 | 0.2705 (2) | 0.5171 (2) | 1.02765 (14) | 0.0380 (3) |
| C7 | 0.4267 (3) | 0.6859 (3) | 1.09254 (17) | 0.0472 (4) |
| H7 | 0.4694 | 0.7209 | 1.1863 | 0.057* |
| C8 | 0.5135 (3) | 0.7961 (2) | 1.01716 (19) | 0.0477 (4) |
| H8 | 0.6143 | 0.9081 | 1.0587 | 0.057* |
| C9 | 0.4499 (2) | 0.7397 (2) | 0.87556 (17) | 0.0399 (3) |
| H9 | 0.5114 | 0.8166 | 0.8252 | 0.048* |

*Atomic displacement parameters (Å²)*

| | $U^{11}$ | $U^{22}$ | $U^{33}$ | $U^{12}$ | $U^{13}$ | $U^{23}$ |
|---|---|---|---|---|---|---|
| Co1 | 0.03912 (11) | 0.03282 (10) | 0.02878 (9) | 0.01827 (8) | 0.01518 (7) | 0.01036 (7) |
| N1 | 0.0545 (7) | 0.0401 (6) | 0.0290 (5) | 0.0302 (6) | 0.0127 (5) | 0.0079 (4) |
| N2 | 0.0667 (9) | 0.0457 (7) | 0.0283 (5) | 0.0350 (7) | 0.0140 (6) | 0.0078 (5) |
| N3 | 0.1122 (18) | 0.0450 (9) | 0.0614 (11) | 0.0375 (10) | 0.0127 (11) | −0.0016 (8) |
| N4 | 0.0864 (13) | 0.0440 (8) | 0.0944 (14) | 0.0265 (8) | 0.0690 (12) | 0.0229 (9) |
| N5 | 0.0422 (6) | 0.0372 (6) | 0.0418 (6) | 0.0172 (5) | 0.0174 (5) | 0.0138 (5) |
| N6 | 0.0596 (9) | 0.0660 (10) | 0.0586 (9) | 0.0427 (8) | 0.0341 (8) | 0.0322 (8) |
| N7 | 0.0330 (5) | 0.0299 (5) | 0.0327 (5) | 0.0154 (4) | 0.0094 (4) | 0.0088 (4) |
| N8 | 0.0384 (6) | 0.0306 (5) | 0.0355 (6) | 0.0125 (5) | 0.0118 (5) | 0.0065 (4) |
| C1 | 0.0347 (6) | 0.0331 (6) | 0.0295 (5) | 0.0216 (5) | 0.0125 (4) | 0.0111 (4) |
| C2 | 0.0363 (6) | 0.0321 (6) | 0.0358 (6) | 0.0195 (5) | 0.0169 (5) | 0.0137 (5) |
| C3 | 0.0457 (8) | 0.0407 (7) | 0.0561 (9) | 0.0227 (6) | 0.0275 (7) | 0.0249 (7) |
| C4 | 0.0661 (11) | 0.0702 (12) | 0.0570 (10) | 0.0443 (10) | 0.0402 (9) | 0.0426 (10) |

| | | | | | | |
|---|---|---|---|---|---|---|
| C5 | 0.0646 (10) | 0.0722 (12) | 0.0359 (7) | 0.0475 (10) | 0.0247 (7) | 0.0257 (8) |
| C6 | 0.0479 (8) | 0.0513 (8) | 0.0298 (6) | 0.0352 (7) | 0.0123 (5) | 0.0115 (6) |
| C7 | 0.0541 (9) | 0.0592 (10) | 0.0331 (7) | 0.0383 (8) | 0.0005 (6) | −0.0009 (6) |
| C8 | 0.0439 (8) | 0.0418 (8) | 0.0489 (9) | 0.0220 (7) | −0.0035 (7) | −0.0050 (7) |
| C9 | 0.0375 (7) | 0.0325 (6) | 0.0465 (8) | 0.0138 (5) | 0.0073 (6) | 0.0065 (6) |

*Geometric parameters (Å, º)*

| | | | |
|---|---|---|---|
| Co1—N1 | 2.1020 (13) | N8—H8B | 0.88 (3) |
| Co1—N7 | 2.1100 (12) | C1—C2 | 1.418 (2) |
| Co1—N4 | 2.1222 (17) | C1—C6 | 1.4186 (19) |
| Co1—N8 | 2.1684 (13) | C2—C3 | 1.371 (2) |
| Co1—N6$^{i}$ | 2.1685 (15) | C3—C4 | 1.411 (3) |
| Co1—N1$^{ii}$ | 2.2047 (12) | C3—H3 | 0.93 |
| N1—N2 | 1.2012 (19) | C4—C5 | 1.368 (3) |
| N1—Co1$^{ii}$ | 2.2046 (12) | C4—H4 | 0.93 |
| N2—N3 | 1.147 (2) | C5—C6 | 1.410 (3) |
| N4—N5 | 1.176 (2) | C5—H5 | 0.93 |
| N5—N6 | 1.161 (2) | C6—C7 | 1.417 (3) |
| N6—Co1$^{i}$ | 2.1685 (15) | C7—C8 | 1.355 (3) |
| N7—C9 | 1.3273 (19) | C7—H7 | 0.93 |
| N7—C1 | 1.3653 (18) | C8—C9 | 1.407 (2) |
| N8—C2 | 1.4427 (19) | C8—H8 | 0.93 |
| N8—H8A | 0.84 (3) | C9—H9 | 0.93 |
| | | | |
| N1—Co1—N7 | 163.50 (5) | Co1—N8—H8B | 110.0 (18) |
| N1—Co1—N4 | 94.66 (8) | H8A—N8—H8B | 108 (2) |
| N7—Co1—N4 | 96.60 (7) | N7—C1—C2 | 117.90 (12) |
| N1—Co1—N8 | 90.80 (5) | N7—C1—C6 | 122.02 (13) |
| N7—Co1—N8 | 78.65 (5) | C2—C1—C6 | 120.08 (13) |
| N4—Co1—N8 | 173.93 (8) | C3—C2—C1 | 119.16 (14) |
| N1—Co1—N6$^{i}$ | 93.17 (6) | C3—C2—N8 | 123.91 (14) |
| N7—Co1—N6$^{i}$ | 98.59 (6) | C1—C2—N8 | 116.92 (12) |
| N4—Co1—N6$^{i}$ | 91.25 (7) | C2—C3—C4 | 120.74 (17) |
| N8—Co1—N6$^{i}$ | 85.77 (6) | C2—C3—H3 | 119.6 |
| N1—Co1—N1$^{ii}$ | 80.75 (5) | C4—C3—H3 | 119.6 |
| N7—Co1—N1$^{ii}$ | 87.21 (4) | C5—C4—C3 | 120.97 (16) |
| N4—Co1—N1$^{ii}$ | 90.05 (7) | C5—C4—H4 | 119.5 |
| N8—Co1—N1$^{ii}$ | 93.47 (5) | C3—C4—H4 | 119.5 |
| N6$^{i}$—Co1—N1$^{ii}$ | 173.87 (6) | C4—C5—C6 | 119.92 (15) |
| N2—N1—Co1 | 119.76 (10) | C4—C5—H5 | 120.0 |
| N2—N1—Co1$^{ii}$ | 122.01 (12) | C6—C5—H5 | 120.0 |
| Co1—N1—Co1$^{ii}$ | 99.25 (5) | C5—C6—C7 | 123.32 (15) |
| N3—N2—N1 | 179.1 (2) | C5—C6—C1 | 119.12 (16) |
| N5—N4—Co1 | 121.28 (13) | C7—C6—C1 | 117.56 (15) |
| N6—N5—N4 | 176.53 (18) | C8—C7—C6 | 119.57 (15) |
| N5—N6—Co1$^{i}$ | 137.61 (13) | C8—C7—H7 | 120.2 |
| C9—N7—C1 | 118.25 (13) | C6—C7—H7 | 120.2 |

| | | | |
|---|---|---|---|
| C9—N7—Co1 | 126.30 (11) | C7—C8—C9 | 119.45 (16) |
| C1—N7—Co1 | 115.42 (9) | C7—C8—H8 | 120.3 |
| C2—N8—Co1 | 111.12 (9) | C9—C8—H8 | 120.3 |
| C2—N8—H8A | 108.7 (17) | N7—C9—C8 | 123.12 (16) |
| Co1—N8—H8A | 109.8 (17) | N7—C9—H9 | 118.4 |
| C2—N8—H8B | 109.3 (18) | C8—C9—H9 | 118.4 |
| | | | |
| C9—N7—C1—C2 | 178.36 (12) | C3—C4—C5—C6 | −0.6 (3) |
| Co1—N7—C1—C2 | 0.21 (14) | C4—C5—C6—C7 | −179.72 (15) |
| C9—N7—C1—C6 | −1.73 (19) | C4—C5—C6—C1 | −0.1 (2) |
| Co1—N7—C1—C6 | −179.88 (9) | N7—C1—C6—C5 | −178.82 (12) |
| N7—C1—C2—C3 | 178.61 (12) | C2—C1—C6—C5 | 1.10 (19) |
| C6—C1—C2—C3 | −1.30 (19) | N7—C1—C6—C7 | 0.79 (19) |
| N7—C1—C2—N8 | −0.50 (17) | C2—C1—C6—C7 | −179.29 (12) |
| C6—C1—C2—N8 | 179.58 (12) | C5—C6—C7—C8 | −179.68 (15) |
| Co1—N8—C2—C3 | −178.54 (11) | C1—C6—C7—C8 | 0.7 (2) |
| Co1—N8—C2—C1 | 0.52 (15) | C6—C7—C8—C9 | −1.3 (2) |
| C1—C2—C3—C4 | 0.6 (2) | C1—N7—C9—C8 | 1.2 (2) |
| N8—C2—C3—C4 | 179.60 (14) | Co1—N7—C9—C8 | 179.11 (11) |
| C2—C3—C4—C5 | 0.4 (3) | C7—C8—C9—N7 | 0.3 (2) |

Symmetry codes: (i) −*x*+1, −*y*+1, −*z*+1; (ii) −*x*, −*y*+1, −*z*+1.

*Hydrogen-bond geometry (Å, º)*

| *D*—H···*A* | *D*—H | H···*A* | *D*···*A* | *D*—H···*A* |
|---|---|---|---|---|
| N8—H8*A*···N3$^{iii}$ | 0.84 (3) | 2.46 (3) | 3.218 (2) | 151 (2) |
| N8—H8*B*···N4$^{ii}$ | 0.88 (3) | 2.73 (3) | 3.502 (3) | 148 (2) |

Symmetry codes: (ii) −*x*, −*y*+1, −*z*+1; (iii) −*x*, −*y*, −*z*+1.