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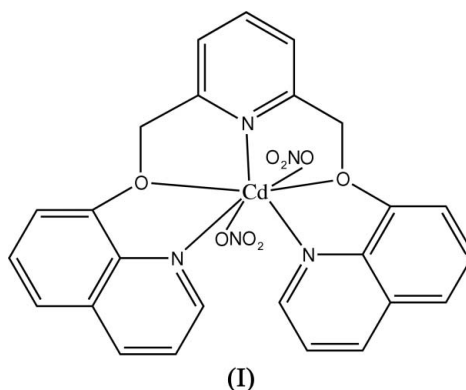
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**Key indicators**Single-crystal X-ray study  
 $T = 298\text{ K}$   
Mean  $\sigma(\text{C}-\text{C}) = 0.010\text{ \AA}$   
Disorder in main residue  
 $R$  factor = 0.050  
 $wR$  factor = 0.128  
Data-to-parameter ratio = 10.9For details of how these key indicators were  
automatically derived from the article, see  
<http://journals.iucr.org/e>.**[2,6-Bis(8-quinolyloxymethyl)pyridine]dinitrato-  
cadmium(II)**

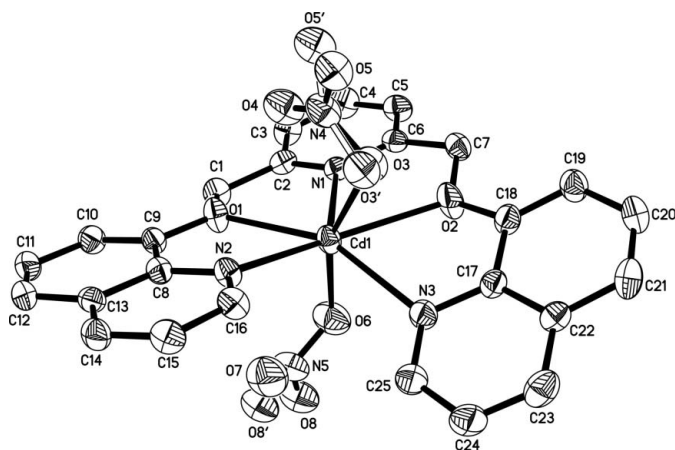
In the title complex,  $[\text{Cd}(\text{NO}_3)_2(\text{C}_{25}\text{H}_{19}\text{N}_3\text{O}_2)]$ , the coordination environment around cadmium consists of four O and three N atoms in the form of a distorted pentagonal bipyramid.

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Recently, much interest has been shown in the investigation of open chain crown ethers, especially those containing N and O atoms, because mixed-donor open chain ligands can selectively coordinate transition and post-transition metal ions (Tummler *et al.*, 1977; Guo & Tan, 2003; Beynek *et al.*, 1998; Seitz *et al.*, 2004), and have remarkable applications in extracting the lanthanide metals (Wu, 1992) and removing these metal ions from the body in cases of metal poisoning. However, there are no crystal structure reports of complexes containing the *L* ligand [where *L* is 2,6-bis(8-quinolyloxymethyl)pyridine]. In the title complex, (I), the Cd atom and the five donor atoms of *L* are in an approximately planar array, while the two monodentate nitrate ions occupy the axial sites to form a distorted pentagonal bipyramidal coordination geometry. The average Cd–O(*L*) and the Cd–N(1)(py) bond lengths are 2.442 Å and 2.360 (5) Å, respectively, which are shorter than those in [2,6-bis(2'-aminophenoxy)methyl]pyridine-*N,N',N'',O,O'*]bis(nitrato-*O*)cadmium(II) (2.613 and 2.398 Å, respectively; Adam *et al.*, 1990), while the average Cd–O(nitrate) bond length (2.367 Å) is longer than the corresponding Cd–O(nitrate) length (2.361 Å) in the above-mentioned compound (Adam *et al.*, 1990).

**Experimental**

2,6-Bis(8-quinolyloxymethyl)pyridine (10 ml, 1 mmol) in ethyl acetate (10 ml) was added to a solution of  $\text{Cd}(\text{NO}_3)_2$  (0.1 mmol) in methanol (10 ml) with continuous stirring at room temperature for



**Figure 1**

Drawing of the title complex, showing the atomic numbering scheme and displacement ellipsoids at the 30% probability level. H atoms have been omitted for clarity. All disordered atoms are shown.

3 h. The reaction mixture was filtered, the precipitate was dissolved in  $\text{CH}_3\text{CN}$ , and colourless single crystals were obtained by slowly evaporating the solvent (m.p. 519–521 K). Analysis calculated for  $\text{C}_{25}\text{H}_{19}\text{CdN}_3\text{O}_8$ : C 47.63, H 3.02, N 11.11%; found: C 47.54, H 3.06, N 11.18%.

#### Crystal data

$[\text{Cd}(\text{NO}_3)_2(\text{C}_{25}\text{H}_{19}\text{N}_3\text{O}_2)]$   
 $M_r = 629.85$   
 Triclinic,  $P\bar{1}$   
 $a = 9.061$  (2) Å  
 $b = 10.523$  (3) Å  
 $c = 13.035$  (3) Å  
 $\alpha = 93.573$  (4)°  
 $\beta = 100.780$  (3)°  
 $\gamma = 97.351$  (4)°  
 $V = 1206.2$  (5) Å<sup>3</sup>

$Z = 2$   
 $D_x = 1.734$  Mg m<sup>-3</sup>  
 Mo  $K\alpha$  radiation  
 Cell parameters from 6106 reflections  
 $\theta = 2.7$ – $25.0$ °  
 $\mu = 0.97$  mm<sup>-1</sup>  
 $T = 298$  (2) K  
 Prism, colourless  
 $0.20 \times 0.18 \times 0.10$  mm

#### Data collection

Bruker SMART CCD area-detector diffractometer  
 $\varphi$  and  $\omega$  scans  
 Absorption correction: multi-scan (SADABS; Sheldrick, 1996)  
 $T_{\min} = 0.830$ ,  $T_{\max} = 0.909$   
 6106 measured reflections

4145 independent reflections  
 3125 reflections with  $I > 2\sigma(I)$   
 $R_{\text{int}} = 0.023$   
 $\theta_{\text{max}} = 25.0$ °  
 $h = -6 \rightarrow 10$   
 $k = -12 \rightarrow 12$   
 $l = -15 \rightarrow 13$

#### Refinement

Refinement on  $F^2$   
 $R[F^2 > 2\sigma(F^2)] = 0.050$   
 $wR(F^2) = 0.128$   
 $S = 1.06$   
 4145 reflections  
 382 parameters  
 H-atom parameters constrained

$$w = 1/[\sigma^2(F_o^2) + (0.0701P)^2 + 0.0481P]$$

where  $P = (F_o^2 + 2F_c^2)/3$   
 $(\Delta/\sigma)_{\text{max}} = 0.001$   
 $\Delta\rho_{\text{max}} = 1.10 \text{ e \AA}^{-3}$   
 $\Delta\rho_{\text{min}} = -1.42 \text{ e \AA}^{-3}$

All H atoms were placed geometrically and treated as riding on their parent atoms, with C–H = 0.93 (aromatic) or 0.97 Å (methylene). The  $U_{\text{iso}}(\text{H})$  values were set at  $1.2U_{\text{eq}}(\text{C})$ . Nitrate atoms O3, O5 and O8 are disordered over two sites each. The disordered orientations were refined with site occupation factors of 0.52 (1) for O3, O5 and O8, and 0.48 (1) for O3', O5' and O8'. The highest electron density peak is 0.95 Å from Cd1 and the deepest hole 0.11 Å from O4.

Data collection: SMART (Siemens, 1996); cell refinement: SAINT (Siemens, 1996); data reduction: SAINT; program(s) used to solve structure: SHELXS97 (Sheldrick, 1997); program(s) used to refine structure: SHELXL97 (Sheldrick, 1997); molecular graphics: SHELXTL (Bruker, 1997); software used to prepare material for publication: SHELXTL.

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#### References

- Adam, K. R., Donnelly, S., Leong, A. J., Lindoy, L. F., McCool, B. J., Bashall, A., Murphy, M. R., Mcpartlin, M., Fenton, D. E. & Tasker, P. A. (1990). *J. Chem. Soc. Dalton Trans.* pp. 1635–1643.
- Beynek, N., McPartlin, M., Murphy, B. P. & Scowen, I. J. (1998). *Polyhedron*, **17**, 2137–2140.
- Bruker (1997). SHELXTL. Version 5.1. Bruker AXS Inc., Madison, Wisconsin, USA.
- Guo, Z. J. & Tan, M. Y. (2003). *J. Nucl. Radiochem.* **25**, 177–180.
- Seitz, M., Kaiser, A., Stempfhuber, S., Zabel, M. & Reiser, O. (2004). *J. Am. Chem. Soc.* **126**, 11426–11427.
- Sheldrick, G. M. (1996). SADABS. University of Göttingen, Germany.
- Sheldrick, G. M. (1997). SHELXL97 and SHELXS97. University of Göttingen, Germany.
- Siemens (1996). SMART and SAINT. Siemens Analytical X-ray Instruments Inc., Madison, Wisconsin, USA.
- Tummler, B., Maass, G., Weber, E., Wehner, W. & Vogtle, F. (1977). *J. Am. Chem. Soc.* **99**, 4683–4690.
- Wu, C. T. (1992). *Crown Ether Chemistry*, pp. 353–356. Beijing: Science Press.