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Crystallographic report

Diaquacadmium bis(iminodiacetato)cobaltate, a two-dimensional heterometallic network

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In the title compound, each $Cd(H_2O)_2^{2+}$ is linked to two carboxyl and two carbonyl oxygen atoms, all belonging to different $[(NC_4H_5O_4)_2Co]^{2-}$ moieties, to furnish a two-dimensional heterometallic network. Both metal atoms display octahedral coordination. The layers are further held together by hydrogen bonding interactions. Copyright © 2003 John Wiley & Sons, Ltd.

KEYWORDS: cobalt complex; cadmium compound; heterometallic network; crystal structure

COMMENT

In heterometallic networks, magnetic ordering occurs when two metal centres interact through an appropriate linking anion.[1] A large number of such mixed-metal complexes are known.[1] In the title main group–transition metal complex, both the cadmium(II) and cobalt(II) atoms lie on centrosymmetric sites and display octahedral coordination. The $[Cd(OH_2)_2]^{2+}$ cations are linked to two carboxyl and two carbonyl oxygen atoms, all belonging to different bis-*O*,*O*,*N*-chelated $[Co(NC_4H_5O_4)_2]^{2-}$ metallo-ligand moieties, to furnish a layer structure (Fig. 1). The layers are further held together by hydrogen bonding interactions.

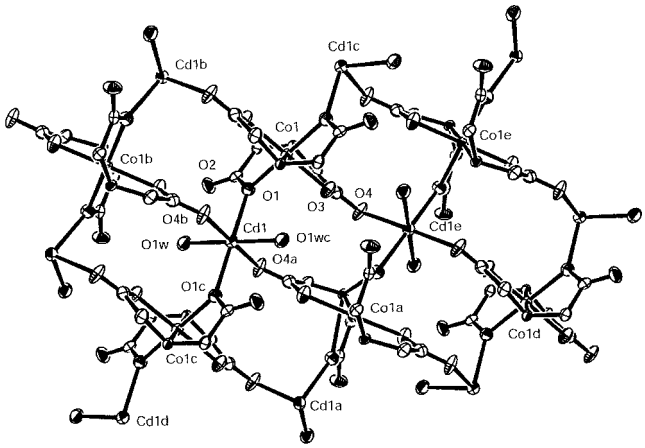

Figure 1. Layer structure of the title complex viewed along the *c*-axis. Hydrogen atoms are omitted for clarity. Key geometry parameters: Cd1 – O4a 2.233(4), Cd1 – O1 2.276(4), Cd1 – O1w 2.303(4), Co1 – O3 2.085(4), Co1 – N1 2.147(4), Co1 – O1 2.148(4) Å; O4a – Cd1 – O1 91.37(15), O4b – Cd1 – O1 88.63(15), O4a – Cd1 – O1w 95.54(14), O4b – Cd1 – O1w 84.46(14), O1 – Cd1 – O1w 90.13(14), O1c – Cd1 – O1w 89.87(14), O3 – Co1 – N1 81.05(14), O3 – Co1 – N1d 98.95(1), O3d – Co1 – O1 87.87(15), O3 – Co1 – O1 92.13(15), N1d – Co1 – O1 103.94(15), N1 – Co1 – O1 76.06(15)°. Symmetry code: (a) $-x+3/2$, $y+1/2$, $-z+1$; (b) $x-1/2$, $-y+1/2$, z; (c) $-x+1$, $-y+1$, $-z+1$; (d) $-x+2$, $-y+1$, $-z+1$; (e) $-x+3/2$, $y-1/2$, $-z+1$.

EXPERIMENTAL

Synthesis

Cadmium(II) nitrate (0.35 g, 1 mmol) dissolved in a small volume of water was added to a 10 ml solution of cobalt(II) nitrate (0.29 g,

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1 mmol) and iminodiacetate (0.26 g, 2 mmol) that had been kept at pH 6. Faint-red crystals separated from solution after several days in 80% yield (0.39 g).

Crystallography

Intensity data were collected at 273 K on a Bruker Apex 2000 area-detector diffractometer for a $0.10 \times 0.30 \times 0.36$ mm^3 crystal. $C_8H_{14}CdCoN_2O_{10}$, $M = 469.54$, monoclinic, $P2_1/a$, $a = 7.7288(8)$, $b = 10.9609(12)$, $c = 8.2444(8)$ Å, $\beta = 110.909(5)°$, $V = 652.43(12)$ Å^3, $Z = 2$; 1484 unique data ($\theta = 28.2°$), 1040 data with $I > 2\sigma(I)$. $R_1 = 0.046$, $wR_2 = 0.119$; $\rho_{max} = 1.42^{-}$eÅ^{-3}. Programs used: SHELXS-97, SHELXL-97 and ORTEP. CCDC deposition number: 203 965

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