**CRYSTAL STRUCTURE OF BIS{(N,N'-DIMETHYLFORMAMIDE)
(μ -ACETATO)[μ -(N,N'-BIS(SALICYLIDENE)-2-HYDROXY-1,3-
PROPANEDIAMINE] NICKEL(II) } CADMIUM(II)**

Hasan Nazir^{*1}, Cengiz Arici², Ingrid Svoboda³, Ece Düzgün¹, Orhan Atakol¹,
and Hartmut Fuess³

¹ Department of Chemistry, Ankara University, Tandogan 06100 Ankara, Turkey

² Department of Physics Engineering, Hacettepe University, Beytepe 06532 Ankara, Turkey

³ Strukturforschung, FB Materialwissenschaft, Technische Hochschule Darmstadt
Petersenstrasse 23, D-64287 Darmstadt, Germany

Figure 1. The ORTEP [3] drawing of the title complex. The displacement ellipsoids are drawn at the 50% probability level and H atoms are shown as small circles of arbitrary radii.

Comment

In this study molecular structure of Ni-Cd-Ni linear trinuclear centrosymmetric complex is reported as shown in Fig. 1. A similar complex, reported previously, was prepared using the same ligand with the exception of hydroxyl group [1]. In the present complex, each nickel atom is coordinated by 4 oxygen and 2 nitrogen atoms and the central cadmium atom is coordinated by 6 oxygen atoms. The metal centres have octahedral sphere, forming three neighbouring octahedrons with one shared edge. The central octahedron has a geometry that is very close to being ideal. The Ni...Cd distance is 3.2158(14) Å. In the previous studies with similar complexes the distance between Ni(II) ion and some first series transition metal(II) ions was found to be 3.133 Å at most [2]. This difference can readily be attributed to the larger diameter of Cd(II) ion. The hydroxyl group of the propylene bridge forms a hydrogen bond with the oxygen atom of the DMF group so that O6-H6...O1: O6-H6 distance is 1.09(9) Å, H6...O1 distance is 1.89(9) Å, O6...O1 distance is 2.969(10) Å and O6-H6...O1 angle is 172(7)°.

Experimental

Preparation: The title complex was prepared in two steps. Step 1: N,N'-bis(salicylidene)-2-hydroxy-1,3-propanediamine (1.410 g, 5 mmol) was dissolved in 70 mL of EtOH. Then, 10 mL ammonia (% 20) and 50 mL hot aqueous solution of NiCl₂·6H₂O (1.190 g, mmol) were added to this solution. The final mixture was set aside for 2-3 hours and light green coloured crystals (C₁₇H₁₆N₂O₂Ni) were filtered and oven dried at 423 K. Step 2: The complex (0.354 g, 1 mmol) prepared in step 1 was dissolved in 50 mL DMF by heating. A

solution of $\text{Cd}(\text{AcO})_2 \cdot 2\text{H}_2\text{O}$ (0.134 g, 0.5 mmol) in 20 mL hot MeOH was added and the final mixture was set aside for 1 day. The light green crystals thus formed were filtered and dried in air.

Crystallography:

Table 1. Crystal and experimental data

Formula: $\text{C}_{44}\text{H}_{52}\text{N}_6\text{O}_{12}\text{Ni}_2\text{Cd}$	Formula weight = 1086.84
Crystal system: Triclinic	Crystal size, mm = 0.150 x 0.130 x 0.050
Space group: $P\bar{1}$ $Z = 1$	Diffraction: Enraf-Nonius CAD-4
$a, b, c, \text{\AA} = 9.461(2), 10.634(2), 12.727(3)$	$\mu(\text{Mo K}\alpha), \text{mm}^{-1} = 1.33$
$\alpha, \beta, \gamma, ^\circ = 66.82(2), 80.80(2), 89.78(10)$	$D_x, \text{g/cm}^3 = 1.557$
$V, \text{\AA}^3 = 1159.5(4)$	$\theta_{\text{max}}, ^\circ = 30.73$
Temperature, K = 299	Weighting scheme:
Absorption correction: Empirical via ψ scans	$w = 1/[\sigma^2(F_o^2) + (0.04 P)^2 + 1.0839 P]$
Trans. Factors ($T_{\text{min}}, T_{\text{max}}$) = 0.776, 0.867	where $P = (F_o^2 + 2F_c^2) / 3$
$F(000) = 558$	$\Delta\rho_{\text{min}}, \Delta\rho_{\text{max}} (\text{e}\text{\AA}^{-3}) = -0.58, 0.45$
Reflns. Meas. = 4235	Program used: WinGX [4], SHELXS-97 [5],
Reflns unique, $R_{\text{int}} = 2960, 0.04$	SHELXL-97 [6], Platon [3]
Reflns with $I \geq 2\sigma(I) = 1487$	Deposition number: CCDC 157537
$R(\text{Obs.}), R_w(F^2)(\text{Obs.}) = 0.043, 0.084$	

Table 2. Selected bond distances ($\text{\AA}$) and bond angles ($^\circ$)

Ni1-Cd1	3.0634(14)	Ni1-O2	2.027(6)	Ni1-N1	2.041(7)
Cd1-O2	2.257(5)	Ni1-O3	2.012(5)	Ni1-N2	2.039(9)
Cd1-O3	2.259(7)	Ni1-O5	2.041(5)		
Cd1-O4	2.284(5)				
Ni1-O2-Cd1	97.1(2)	O3-Ni1-N1	170.6(3)	N2-Ni1-O5	93.1(3)
Ni1-O3-Cd1	97.5(3)	O2-Ni1-N1	89.0(3)	N1-Ni1-O5	91.4(2)
O3-Ni1-O2	84.4(3)	N2-Ni1-N1	96.7(3)	O2-Cd1-O3	73.8(2)
O3-Ni1-N2	89.2(3)	O3-Ni1-O5	95.7(2)	O2-Cd1-O4	84.7(2)
O2-Ni1-N2	171.3(2)	O2-Ni1-O5	93.4(2)	O3-Cd1-O4	86.0(2)

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