Acta Crystallographica Section E
Structure Reports Online
ISSN 1600-5368

Bis(quinolin-8-olato-κ^2N,O)lead(II)

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Received 6 April 2005
Accepted 18 April 2005
Online 14 May 2005

Key indicators

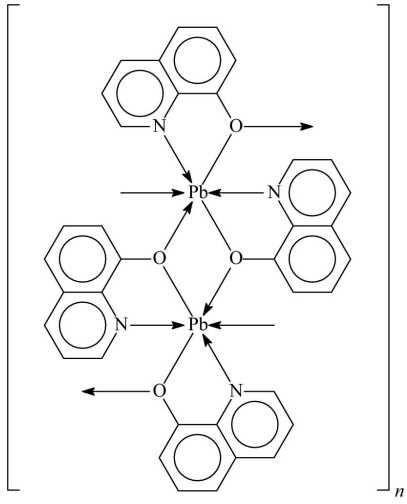
Single-crystal X-ray study
T = 295 K
Mean σ(C–C) = 0.009 Å
R factor = 0.030
wR factor = 0.075
Data-to-parameter ratio = 16.8

For details of how these key indicators were automatically derived from the article, see http://journals.iucr.org/e.

The Pb^{II} atom in the title compound, $[Pb(C_9H_6NO)_2]$, is N,O-chelated by two organic ligands, and two molecules are linked across a centre of inversion to form a dinuclear entity. These dinuclear entities are linked by somewhat weaker Pb···O bonds into a chain. There are two independent molecules in the asymmetric unit with similar geometry around the Pb atoms, which have a pseudo-pentagonal–bipyramidal coordination with one of the axial positions occupied by the Pb lone pair. Some distances involving the Pb atoms are significantly different between the two molecules.

Comment

The 8-hydroxyquinoline derivative of lead(II) is known to be a sparingly soluble compound (Packter & Chauhan, 1973). The compound is usually synthesized by precipitating lead(II) ions with 8-hydroxyquinoline, but it can be synthesized using a dry method (Saxena, 2002). The compound has been examined for a number of physical properties, *e.g.* thermal behaviour (Juiz *et al.*, 1997) and enthalpy of formation (Ribeiro da Silva *et al.*, 1994). Its synthesis by a hydrothermal method has allowed the compound to be characterized by crystallography.



(I)

The Pb^{II} atom in the title compound, (I) (Figs. 1 and 2), is N,O-chelated by two 8-hydroxyquinolinate anions, and two molecules are linked across a centre of inversion to form a dinuclear unit. The geometry of the Pb atom in each of the two independent molecules is pseudo-pentagonal–bipyramidal, with one of the axial positions occupied by the Pb lone pair. Adjacent dinuclear units are linked into a chain by somewhat weaker Pb···O interactions (Fig. 3).

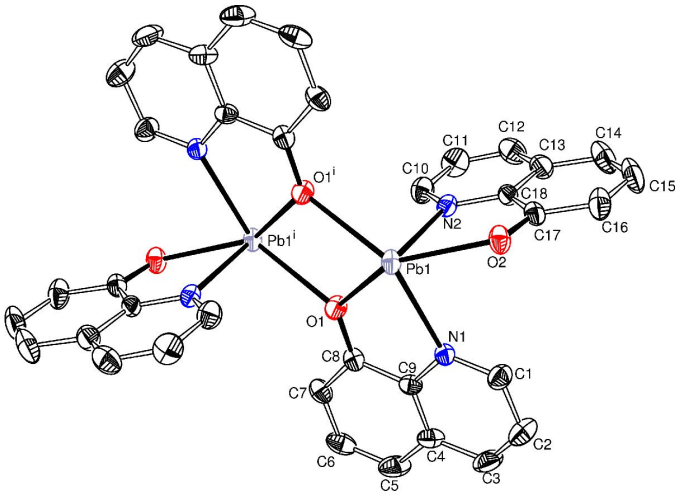


Figure 1
A plot of one of the independent centrosymmetric molecules of (I), with the atom-labelling scheme. Displacement ellipsoids are drawn at the 30% probability level. H atoms have been omitted for clarity. [Symmetry code: (i) $\frac{1}{2} - x, \frac{3}{2} - y, 1 - z$.]

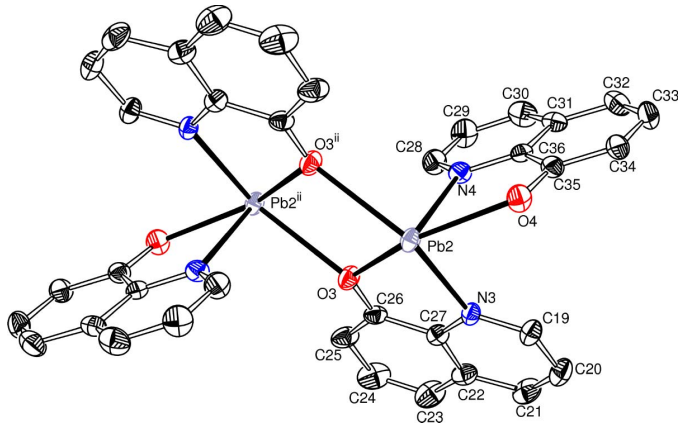


Figure 2
A plot of the second independent centrosymmetric molecule of (I), with the atom-labelling scheme. Displacement ellipsoids are drawn at the 30% probability level. H atoms have been omitted for clarity. [Symmetry code: (ii) $-x, -y, 1 - z$.]

Experimental

Lead acetate trihydrate (0.189 g, 0.5 mmol) and 8-hydroxyquinoline (0.145 g, 1 mmol) were mixed in water (10 ml) and the mixture sealed in a 23 ml Teflon-lined stainless steel Parr bomb, which was then heated at 413 K for 72 h. The bomb was then cooled to room temperature at 10 K h^{-1} to give pale-yellow columnar crystals of (I) in *ca* 45% yield.

Crystal data

$[Pb(C_9H_6NO)_2]$
M_r = 495.59
Monoclinic, $C2/c$
a = 35.937 (2) Å
b = 8.3365 (4) Å
c = 25.432 (1) Å
β = 126.076 (1)°
V = 6158.1 (5) Å^3
Z = 16
D_x = 2.138 Mg m^{-3}
Mo $K\alpha$ radiation
Cell parameters from 4994 reflections
θ = 2.5–27.4°
μ = 10.97 mm^{-1}
T = 295 (2) K
Column, yellow
0.18 × 0.17 × 0.15 mm

Data collection

Bruker APEX CCD area-detector diffractometer
φ and ω scans
Absorption correction: multi-scan (*SADABS*; Bruker, 2002)
T_{min} = 0.077, T_{max} = 0.193
20 725 measured reflections
6956 independent reflections
4910 reflections with $I > 2\sigma(I)$
R_{int} = 0.028
θ_{max} = 27.5°
$h = -41 \rightarrow 46$
$k = -10 \rightarrow 10$
$l = -32 \rightarrow 31$

Refinement

Refinement on F^2
$R[F^2 > 2\sigma(F^2)]$ = 0.030
$wR(F^2)$ = 0.075
S = 1.00
6956 reflections
415 parameters
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.0333P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max}$ = 0.001
$\Delta\rho_{max}$ = 1.07 e Å^{-3}
$\Delta\rho_{min}$ = −1.12 e Å^{-3}

H atoms were positioned geometrically, with C—H 0.93 Å, and were included in the refinement in the riding-model approximation, with $U_{iso}(H) = 1.2U_{eq}(C)$. The final difference Fourier map had a large peak and a hole, each at about 1 Å from Pb1, but was otherwise featureless.

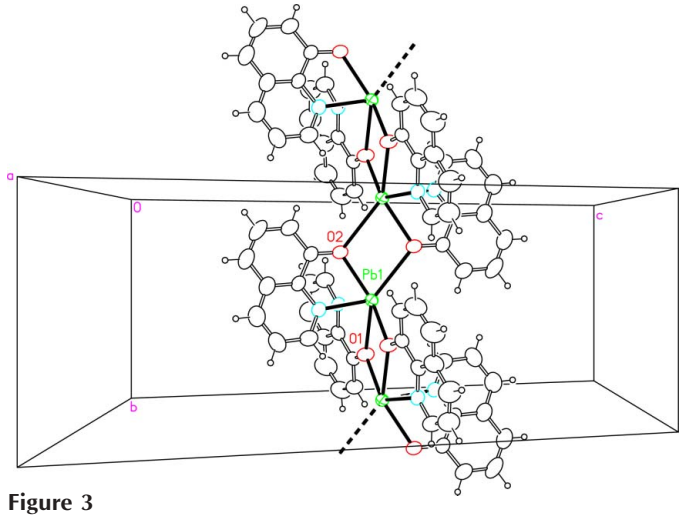


Figure 3
A view showing the formation of a chain running along **b** by association of the dimeric units through weak Pb···O bonds.

Data collection: *SMART* (Bruker, 2002); cell refinement: *SAINT* (Bruker, 2002); data reduction: *SAINT*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *ORTEPIII* (Burnett & Johnson, 1996) and *ORTEP3 for Windows* (Farrugia, 1997); software used to prepare material for publication: *SHELXL97*.

The authors thank the Guangxi Normal University and the University of Malaya for supporting this study.

References

Bruker (2002). *SADABS*, *SAINT* and *SMART*. Bruker AXS Inc, Madison, Wisconsin, USA.
Burnett, M. N. & Johnson, C. K. (1996). *ORTEP*III. Report ORNL-6895. Oak Ridge National Laboratory, Tennessee, USA.
Farrugia, L. J. (1997). *J. Appl. Cryst.* **30**, 565.
Juiz, S. A., Leles, M. I. G., Caires, A. C. F., Boralle, N. & Ionashiro, M. (1997). *J. Therm. Anal.* **50**, 625–632.
Packter, A. & Chauhan, P. (1973). *Krist. Tech.* **8**, 1357–1365.

Ribeiro da Silva, M. A. V., Agostinha, M., Matos, R., Goncalves, J. M., Johnson, P. M., Pilcher, G., Burkinshaw, P. M. & Mortimer, C. T. (1997). *Thermochim. Acta*, **247**, 245–263.

Saxena, A. K. (2002). *Synth. React. Inorg. Met. Org. Chem.* **32**, 595–602.

Sheldrick, G. M. (1997). *SHELXS97* and *SHELXL97*. University of Göttingen, Germany.