

Benjamin D. Read,
 Alexandra M. Z. Slawin and
 J. Derek Woollins*

Department of Chemistry, University of St
 Andrews, St Andrews KY16 9ST, Scotland

Correspondence e-mail: jdw3@st-and.ac.uk

Key indicators

Single-crystal X-ray study
 $T = 93$ K
 Mean $\sigma(\text{C}-\text{C}) = 0.013$ Å
 R factor = 0.051
 wR factor = 0.115
 Data-to-parameter ratio = 14.7

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

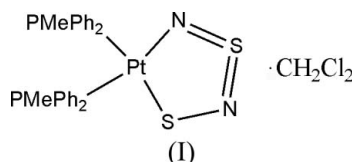
Bis(diphenylmethylphosphine- κP)(disulfur- dinitrido- $\kappa^2 N, S$)platinum(II) dichloro- methane solvate

The title compound, $[\text{Pt}(\text{N}_2\text{S}_2)(\text{C}_{13}\text{H}_{13}\text{P})_2] \cdot \text{CH}_2\text{Cl}_2$, contains Pt^{II} in a square-planar coordination. The five-membered PtS_2N_2 ring contains two short and one long $\text{S}-\text{N}$ bonds. Interestingly, the $\text{S}-\text{N}$ bond lengths have a different pattern from those in the PMe_2Ph analogue and one of the published PPh_3 analogues, but are comparable with those in most other systems containing the disulfurdinitride anion.

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Comment

The disulfurdinitride dianion is not known in simple salts but can be isolated in metal complexes (Kelly & Woollins, 1986; Jones *et al.*, 1985*a,b*; Bates *et al.*, 1986). These complexes may be protonated at the metal-coordinated nitrogen (Jones *et al.*, 1986, 1988), and we have previously commented on the structural consequences of this protonation (Jones *et al.*, 1987). Recently, we developed a new route to diulfurdinitrido complexes (Aucott *et al.*, 2002) and have examined the metallation of the IrS_2N_2 and CoS_2N_2 rings using the AuPR_3 cation as a species which is isolobal with a proton (Aucott *et al.*, 2003; Slawin & Woollins, 2006).



The structure of the title compound, (I), a dichloromethane solvate, is shown in Fig. 1. In (I), the coordination of Pt^{II} is slightly distorted square-planar (Table 1), the five-membered PtS_2N_2 ring being essentially coplanar [maximum deviation from the $\text{PtS}_2\text{N}_2\text{P}_2$ mean plane is 0.06 (1) Å for P1]. The PtS_2N_2 ring contains two short [$\text{N}1-\text{S}1 = 1.525$ (7) and $\text{N}2-\text{S}1 = 1.568$ (8) Å] and one long $\text{S}-\text{N}$ bonds [$\text{S}2-\text{N}2 = 1.665$ (7) Å]. Comparison of the $\text{S}-\text{N}$ bond lengths for the various phosphine-substituted analogues containing this ring reveals that the $\text{S}-\text{N}$ bond lengths have a different pattern from those in the PMe_2Ph analogue (Jones *et al.*, 1988) and one of the published PPh_3 analogues (Chivers *et al.*, 1986), but are comparable with those in most others systems containing the disulfurdinitride anion (Jones *et al.*, 1985*a*; Bates *et al.*, 1986).

Experimental

Compound (I) was prepared as described previously (Belton *et al.*, 1988). $[\text{S}_4\text{N}_3]\text{Cl}$ (0.050 g, 0.24 mmol) was added to liquid NH_3 (15 ml) at 195 K. After stirring for 30 min, solid $\text{Pt}(\text{PPh}_2\text{Me})_2\text{Cl}_2$ (0.120 g,

0.18 mmol) was added and the reaction allowed to warm to room temperature over a period of 4 h, during which time the ammonia evaporated. Residual ammonia was removed *in vacuo* and the resulting solid was extracted into dichloromethane, filtered through Celite and subjected to column chromatography using silica gel [$\text{CH}_2\text{Cl}_2/\text{hexane}$ (1:1) eluent] to give the final product (0.075 g, 0.11 mmol) in 55% yield. Recrystallization from a dichloromethane/hexane (1:1) mixture gave yellow plates.

Crystal data

$[\text{Pt}(\text{N}_2\text{S}_2)(\text{C}_{13}\text{H}_{13}\text{P})_2]\cdot\text{CH}_2\text{Cl}_2$	$Z = 4$
$M_r = 772.56$	$D_x = 1.840 \text{ Mg m}^{-3}$
Monoclinic, $P2_1/n$	Mo $K\alpha$ radiation
$a = 12.792$ (2) Å	$\mu = 5.51 \text{ mm}^{-1}$
$b = 12.289$ (2) Å	$T = 93$ (2) K
$c = 18.564$ (4) Å	Plate, yellow
$\beta = 107.160$ (9)°	$0.10 \times 0.10 \times 0.03 \text{ mm}$
$V = 2788.4$ (9) Å ³	

Data collection

Rigaku Mercury CCD diffractometer	16094 measured reflections
ω and φ scans	4810 independent reflections
Absorption correction: multi-scan <i>CrystalClear</i> (Rigaku, 2004)	3935 reflections with $I > 2\sigma(I)$
$T_{\min} = 0.587$, $T_{\max} = 0.856$	$R_{\text{int}} = 0.070$
	$\theta_{\text{max}} = 25.4^\circ$

Refinement

Refinement on F^2	$w = 1/[\sigma^2(F_o^2) + (0.0544P)^2 + 24.9689P]$
$R[F^2 > 2\sigma(F^2)] = 0.051$	where $P = (F_o^2 + 2F_c^2)/3$
$wR(F^2) = 0.115$	$(\Delta/\sigma)_{\text{max}} = 0.003$
$S = 1.05$	$\Delta\rho_{\text{max}} = 1.28 \text{ e \AA}^{-3}$
4810 reflections	$\Delta\rho_{\text{min}} = -2.11 \text{ e \AA}^{-3}$
328 parameters	
H-atom parameters constrained	

Table 1

Selected geometric parameters (Å, °).

Pt1—N1	2.052 (7)	Pt1—S2	2.271 (2)
Pt1—P2	2.243 (2)	Pt1—P1	2.281 (2)
N1—Pt1—S2	87.7 (2)	N1—Pt1—P1	83.6 (2)
P2—Pt1—S2	89.67 (8)	P2—Pt1—P1	99.00 (8)

All H atoms were included in calculated positions ($\text{C—H} = 0.98$ Å for methyl H atoms, 0.99 Å for methylene H atoms and 0.95 Å for aryl H atoms) and were refined as riding atoms, with $U_{\text{iso}}(\text{H}) = 1.2U_{\text{eq}}(\text{methylene and aryl C})$ or $1.5U_{\text{eq}}(\text{methyl C})$. The highest peak in the difference map is 1.48 Å from atom Pt1 and the deepest hole is 0.89 Å from the same atom.

Data collection: *CrystalClear* (Rigaku, 2004); cell refinement: *CrystalClear*; data reduction: *CrystalClear*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *SHELXTL* (Sheldrick, 2003); software used to prepare material for publication: *SHELXTL*.

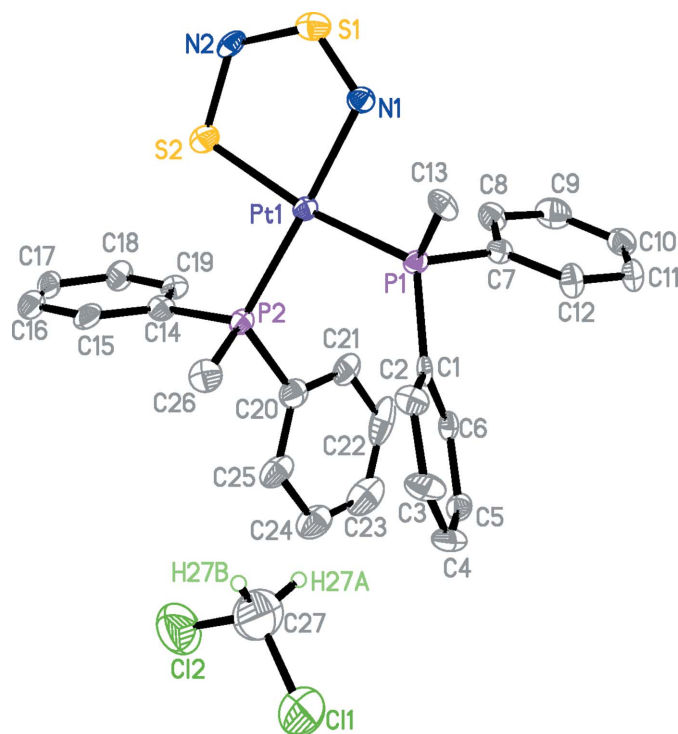


Figure 1

The molecular structure of (I), with displacement ellipsoids drawn at the 50% probability level. H atoms of the complex molecule have been omitted.

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