Derivatives of Tetramethylplatinum

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IN a recent paper it is stated that tetramethylplatinum(IV) is nonexistent (private communications by H. C. Brown and by L. F. Dahl to E. L. Amma).[1] This has prompted us to report that we have made some stable derivatives of tetramethylplatinum(IV) of type $[PtMe_4L_2]$ with L = $AsMe_2Ph$, PMe_2Ph, or PEt_3.

TABLE

Methyl resonance data for some tetramethylplatinum(IV) *complexes measured at* 60 *Mc./sec. and* 34°

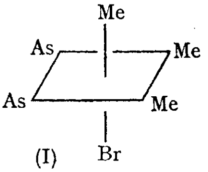
		Me^a			Me^b			Methyls on L		
	Solvent	τ	J_P	J_{Pt}	τ	J_P	J_{Pt}	τ	J_P	J_{Pt}
$[PtMe_4(AsMe_2Ph)_2]$	C_6H_6	9·66		44	8·83		66	8·95		6·5
$[PtMe_4(PMe_2Ph)_2]$	C_6H_6	9·80	6·5	43·5	9·08	*	58	8·83	8·5	11·5
	$CHCl_3$	10·23	6·4	44	9·61	*	57	8·60	8·4	11·5
$[PtMe_4(PEt_3)_2]$	C_6H_6	9·72	5·8	44	†	†	†	complex		

* Complex resonance pattern, see discussion; † Obscured by overlap with other resonances.

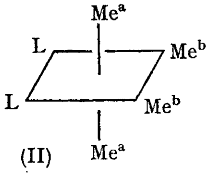
Treatment of *cis*-$[PtCl_2(AsMe_2Ph)_2]$ with methyl-lithium gives *cis*-$[PtMe_2(AsMe_2Ph)_2]$. This reacts with methyl bromide to give $[PtBrMe_3(AsMe_2Ph)_2]$, configuration (I), which reacts with methyl-lithium to give *cis*-$[PtMe_4(AsMe_2Ph_2)_2]$, configuration (II). The configuration (II) follows from the dipole moment of 5·4 D and also from the n.m.r. (methyl) resonance pattern (Table). We have similarly made the complex *cis*-$[PtMe_4(PMe_2Ph)_2]$ and also *cis*-$[PtMe_4(PEt_3)_2]$ by treating $[PtCl_2Me_2(PEt_3)_2]$ with methyl-lithium. In these complexes containing phosphine the two mutually *trans*-methyl groups (platinum bonded) give a simple n.m.r. pattern but we have generally found for both platinum(II) and platinum(IV) that two equivalent methyl groups in *trans*-position to the phosphines give a complex resonance pattern of the type recently reported for *cis*-$[PtMe_2(PPh_3)_2]$[2] except that our compounds, being much more soluble, give better spectra than that published.

Pyrolysis of $[PtMe_4(PMe_2Ph)_2]$ at 160° gives *ca.* quantitative yields of ethane and *cis*-$[PtMe_2(PMe_2Ph)_2]$.

We have also made many complexes of the types $[PtMe_xX_{4-x}L_2]$ with x = 1—3, X = Cl, Br, I, and L = tertiary phosphine or tertiary arsine.



(I)



(II)

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[1] R. G. Vranka and E. L. Amma, *J. Amer. Chem. Soc.*, **1967**, **89**, 3121.

[2] E. O. Greaves, R. Bruce, and P. M. Maitlis, *Chem. Comm.*, 1967, 860.