

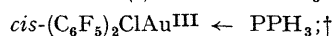
Synthesis of Perfluorophenyl Metal Complexes using $(C_6F_5)_2TlBr$ as Oxidant

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Summary Previously unknown perfluorophenyl-transition-metal complexes have been prepared by a new method involving the oxidation of derivatives of the transition metal in a lower oxidation state with $(C_6F_5)_2TlBr$, which is reduced to thallium(I) bromide with transfer of two C_6F_5 groups.

BISPERFLUOROPHENYLMONOBROMOTHALLIUM(III),¹ which is dimeric, reacts in benzene solution with unco-ordinated (*e.g.* Hg_2Cl_2) or co-ordinated (*e.g.* $Ph_3P \rightarrow AuCl$) post-transition-metal halides to produce bis-perfluorophenyl derivatives of an oxidation state *two* higher than that of the metal in the original compound (except for Hg_2Cl_2) with the precipitation of thallium(I) bromide. $Ph_3P \rightarrow AuCl$ gives



Hg_2Cl_2 forms $(C_6F_5)_2Hg$, described earlier;² and stannous chloride produces $(C_6F_5)_2SnCl_2$, previously reported by Tatlow *et al.*³ Nesmeyanov⁴ *et al.* observed that diphenylthallium(III) bromide gives rise to diphenyltin dichloride

(see below). *trans*- $PdCl_2(PPh_3)_2$ gives rise to the Pd^{IV} complex $(C_6F_5)_2PdCl_2(PPh_3)_2$. The properties of these complexes are shown in the Table.

Properties of perfluorophenyl metal compounds*

Compound	Colour	M.p.	Molec. calc.	Weight found
$(C_6F_5)_2Hg$	white	119°	535	512
$(C_6F_5)_2SnCl_2$	colourless	Lqd.		
<i>cis</i> - $(C_6F_5)_2Pt(PPh_3)_2$	white	245°	1054	1089
<i>cis</i> - $(C_6F_5)_2AuCl(PPh_3)$	white	150°	798	785
$C_6F_5Au(PPh_3)$	white	160°	626	627
$(C_6F_5)_2RhCl(PPh_3)_2$	yellow-brown	265°	997	787
$(C_6F_5)_2PdCl_2(PPh_3)_2$	pale yellow	250° decomp.	1036	1015

* Satisfactory analytical data were obtained in all cases.

Interesting reactions are shown by these C_6F_5 complexes on reduction. Thus when $(C_6F_5)_2AuCl(PPh_3)$ is treated