E2-13: A new synthetic route to platinoboranes

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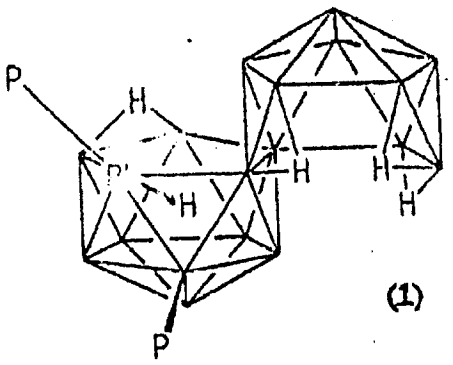
Generally, platinoboranes are prepared by treating the appropriate boron compound (i) with a zerovalent platinum complex (e.g. $[Pt(PR_3)_4]$) or (ii) with a platinum (II) dihalide complex (e.g. $[PtCl_2(PR_3)_2]$) in the presence of a base (to remove HX, X = halide). The products are separated using chromatography and frequently the yields of the isolated products are poor.

In this paper, the use of *cis*-[$PtMe_2(PMe_2Ph_2)_2$] as a mild metallating agent is described. [$PtMe_2(PMe_2Ph_2)_2$] was easily synthesised by treating the corresponding dichloride with MeLi. The advantages of this method are (i) the reagent readily reacts with acidic hydrogens (e.g. bridging and/or *endo* hydrogens) of the borane under mild conditions (ii) the methyl ligands are converted into methane gas making the separation of product(s) easy, and (iii) these reactions give high yields of platinoboranes.

[$PtMe_2(PMe_2Ph_2)_2$] reached quantitatively with [*nido*-$B_{10}H_{14}$] to give the eleven-vertex [*nido*-$(PMe_2Ph)_2PtB_{10}H_{12}$]. The thiaborane [*arachno*-4-SB_8H_{12}] was converted quantitatively into the ten-vertex platinoborane [*arachno*-$(PMe_2Ph)_2PtSB_8H_{10}$]. Similarly, [*nido*-7-$SB_{10}H_{12}$] gave the expected twelve-vertex *closo*-platinoborane $(PMe_2Ph)_2PtSB_{10}H_{10}$] in quantitative yield. Treatment of [$PtMe_2(PMe_2Ph_2)_2$] with [*syn*-$B_{18}H_{22}$] gave a small amount of the expected product [$(PMe_2Ph)_2Pt$-η^4-*syn*-$B_{18}H_{20}$] (13% isolated yield) and a new platinum-hydride [$(PMe_2Ph)HPt$-η^4-*syn*-$B_{18}H_{19}(PMe_2$-Ph)] **(1)** (45% isolated yield) which was characterised by X-ray crystallography.



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