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Preliminary communication

$[n\text{-}Bu_3PCo(CO)_3]_3SnH$; AN UNUSUALLY STABLE STANNANE

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Summary

The preparation, characterization and some reactions of the air-stable stannane, $[n\text{-}Bu_3PCo(CO)_3]_3SnH$ are described.

The recent preparation of transition metal-substituted stannanes of the type M_mSnH_{4-m} ($M = Mn(CO)_5$ or $Re(CO)_5$; $m = 2$ or 3) [1] prompts us to report the title compound.

The direct reaction of $[n\text{-}Bu_3PCo(CO)_3]_2$ with tin(II) halides (mole ratio 3/1) in refluxing ethanol for one day gave two products, the red $[n\text{-}Bu_3PCo(CO)_3]_4Sn$ [2] and the yellow, air-stable crystalline solid, $[n\text{-}Bu_3PCo(CO)_3]_3SnH$ (m.p. 160-162°C). The latter may also be obtained in high yield from $Na[Co(CO)_3P\text{-}n\text{-}Bu_3]$ and tin(II) sulphate in aqueous diglyme. If deuterium oxide is used in place of water, $[n\text{-}Bu_3PCo(CO)_3]_3SnD$ is formed.

The IR spectra of $[n\text{-}Bu_3PCo(CO)_3]_3SnX$ (X = H or D) are very similar to those of the complexes where X = F, Cl, Br, and I [2]. Also there is a resonance at 5.84 in the proton NMR spectrum of the stannane which is absent from the spectra of the derivatives where X = D, F, Cl, Br, or I. It is attributed to the proton bonded directly to the tin atom (cf. ref. 3).

On refluxing $[n\text{-}Bu_3PCo(CO)_3]_3SnH$ in carbon tetrachloride for one hour under nitrogen, $[n\text{-}Bu_3PCo(CO)_3]_3SnCl$ [2] is obtained in 65% yield.

Attempts to prepare $[n\text{-}Bu_3PCo(CO)_3]_3PbH$ by analogous methods were unsuccessful. The only product was $[n\text{-}Bu_3PCo(CO)_3]_4Pb$ [2] in all instances.

References

1 J.P. Collman, J.K. Hoyano and D.W. Murphy, J. Amer. Chem. Soc., 95 (1973) 3424.
2 P. Hackett and A.R. Manning, unpublished observations.
3 P.E. Potler, L. Pratt and G. Wilkinson, J. Chem. Soc., (1964) 524.