

This article was downloaded by:

On: 30 January 2011

Access details: Access Details: Free Access

Publisher Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

Bis(diphenylphosphino)Alkane / Co(II)/Tetrahydroborate and Cyanotrihydroborate Reactions: Formation of Unusual Bis(diphenylphosphino)methane Complexes and the Influence of Carbon Monoxide

D. J. Elliot^a; D. G. Holah^a; A. N. Hughes^a; S. Maciaszek^a; J. D. Thompson^a; V. R. Magnuson^b; K. O. Parker^b

^a Department of Chemistry, Lakehead University, Ontario, Canada ^b Department of Chemistry, University of Minnesota-Duluth, Duluth, Minnesota, U.S.A.

To cite this Article Elliot, D. J. , Holah, D. G. , Hughes, A. N. , Maciaszek, S. , Thompson, J. D. , Magnuson, V. R. and Parker, K. O.(1987) 'Bis(diphenylphosphino)Alkane / Co(II)/Tetrahydroborate and Cyanotrihydroborate Reactions: Formation of Unusual Bis(diphenylphosphino)methane Complexes and the Influence of Carbon Monoxide', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 30: 3, 682

To link to this Article: DOI: 10.1080/03086648708079176

URL: <http://dx.doi.org/10.1080/03086648708079176>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Bis(diphenylphosphino)Alkane / Co(II) / Tetrahydroborate and Cyanotrihydroborate Reactions: Formation of Unusual Bis(diphenylphosphino)methane Complexes and the Influence of Carbon Monoxide

D.J. Elliot, D.G. Holah, A.N. Hughes*, S. Maciaszek, and J.D. Thompson,
Department of Chemistry, Lakehead University, Thunder Bay, Ontario, Canada.

P7B 5E1

and

V.R. Magnuson and K.O. Parker, Department of Chemistry, University of
Minnesota-Duluth, Duluth, Minnesota 55812, U.S.A.

Reactions between Co(II), bis(diphenylphosphino)methane (dppm) and either NaBH₄ or NaBH₃CN have been studied. They follow pathways which are in marked contrast to those followed by Ph₂P(CH₂)_nPPh₂ (n = 2-6) in the presence of NaBH₄ in which the final product is normally CoH(phosphine)₂ although binuclear BH₄-bridged complexes may sometimes be obtained. The products obtained with dppm are Co₂X₃(dppm)₂ (X=Cl,Br) (I), CoCl(dppm)₃ (II), {CoHX(dppm)₂}Y (X=Cl,Br,I,BH₃CN; Y=Cl,BH₃CN,BPh₄,ClO₄) (III), and Co₂H₂(dppm)₃ (IV). While a binuclear A-frame structure can be proposed for the Co(I)-Co(II) species (I), crystal twinning has so far prevented an X-ray determination. However, X-ray studies on (II) and (IV) have shown that (II) contains tetrahedral Co(I) to which one chloro and three monodentate dppm ligands are attached while (IV) is a binuclear species containing bridging dppm ligands and two terminal hydrides. The compounds (III) are octahedral Co(III) complexes. Possible mechanisms for the formation of these in strongly reducing environments will be discussed.

Some of these reactions have also been carried out under CO and similarities of behaviour of dppm and diphos (n=2) then appear. Thus, {Co(CO)(phosphine)₂}X (X=BH₃CN,BPh₄) have been obtained for both phosphines and these reactions also produce Co(III)-diphos complexes related to (III). New Co-CO-phosphine clusters containing multiple terminal and bridging CO groups have also been produced.