A Novel Rhodium(I) Dimer having Dibenzoyldi-imide as Bridging Ligand

By FAROUK MOHAMED HUSSEIN and A. S. KASENALLY*†

(*Department of Chemistry, Faculty of Science, University of Khartoum, Democratic Republic of the Sudan*)

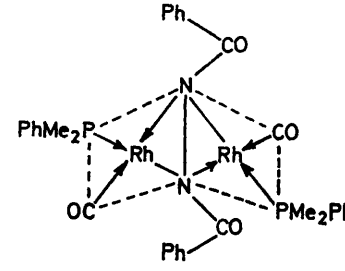
Summary Reaction of *mer*-$RhCl_3(PMe_2Ph)_3$ with dibenzoylhydrazine in refluxing ethanol in presence of a base gives a novel carbonylphosphinerhodium(I) dimer with dibenzoyldi-imide as bridging ligand.

RECENTLY, reports of complexes which contain ligands co-ordinated to a transition metal solely by an azo-group have appeared.[1,2] In these complexes the azo-group is bonded to the metal either *via* a nitrogen lone pair[1,3] or by the formal donation of electrons from the azo-double bond, analogous to that known in metal–olefin complexes.[4] In addition azobenzene is known to form 2-(phenylazo)phenyl-metal complexes which contain a σ-bond between the metal and the *ortho*-carbon atom of one phenyl ring together with the co-ordinate bond arising from donation of the nitrogen lone pair.[5]

We report the preparation of a novel rhodium(I) dimer having dibenzoyldi-imide as bridging ligand. *mer*-$RhCl_3(PMe_2Ph)_3$ reacts with dibenzoylhydrazine (dbh) in refluxing ethanol in presence of a base ($NaHCO_3$) to give $[(PMe_2Ph)(CO)Rh{\cdot}N{\cdot}(COPh)-]_2$.‡ The compound is air and moisture stable and crystallizes as yellow needles. The i.r. spectrum (Nujol) shows the following bands: 1976 (vs), 1926 (vw) [ν_{CO} (rhodium carbonyl)], and 1530 (vs) [ν_{CO} (benzoyl)].

The reaction probably proceeds through reductive carbonylation of the Rh^{III} chloro-compound to give the intermediate $(PMe_2Ph)_2(CO)RhCl$; 2 molecules of the latter react with 1 molecule of dbh eliminating 2 molecules of HCl and one molecule of phosphine per rhodium atom to give the rhodium(I) dimer. A similar compound $[(Ph_3P)(CO)Rh{\cdot}N(COPh)-]_2$‡ is obtained when $(Ph_3P)_2(CO)RhCl$ is treated with dbh under similar conditions.

A possible structure of the compound which agrees with the square-planar configuration of rhodium(I) is shown in the Figure; dibenzoyldi-imide is acting as a tetradentate ligand. This structure is related to that of $[Rh(CO)_2Cl]_2$.[6]



FIGURE

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† *Present address:* Division of Chemistry, School of Agriculture, University of Mauritius, Réduit, Mauritius.

‡ Correct elemental analyses (C,H,N,P) and molecular weight determination (osmometrically in benzene) were obtained for this compound.

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