

N-oxide-carbonyl-PtCl₂ complex with an excess of triphenylphosphine in a gasometric apparatus liberated 1.0 mmole of gas, and the derivative which formed contained no carbon monoxide (infrared).

Since displacement of ethylene by higher olefins in the 1-(4-*Z*-pyridine *N*-oxide)-3-ethylene-2,4-dichloroplatinum(II) complexes leads to *trans* compounds, it is reasonable to assume that carbon monoxide is also *trans* to the pyridine *N*-oxide. However, this is by no means certain. Investigations are currently underway to establish definite configuration of the complexes as well as to evaluate further applications of this synthetic route.

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An unusual adduct from 2,2'-bipyridine and diphenyltin diisocyanate

In an investigation of some organotin isocyanates it was found that diphenyltin diisocyanate was hydrolysed rapidly in the atmosphere and attempts to isolate the pure compound yielded various hydrolysis products including Ph₂Sn₂(NCO)₂O, m.p. 158-162°, and Ph₂Sn₂(NCO)(OH)O, m.p. 300-301°. These compounds are analogous to the hydrolysis products of the organotin dihalides¹.

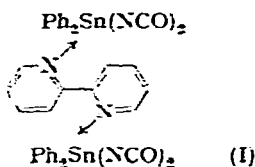
Since complex formation can confer stability to hydrolysis, the crude diphenyltin diisocyanate was treated with 2,2'-bipyridine to give a stable adduct, m.p. 204-206° decomp., which was found from repeated analysis to have the composition bipy·[Ph₂Sn(NCO)₂]₂. (Found: C, 52.9; H, 3.6; N, 9.7; Sn, 27.0. C₃₈H₂₈O₄N₆Sn₂ calcd.: C, 52.5; H, 3.2; N, 9.7; Sn, 27.3%.) This compound contrasts with the adducts reported by Alleston and Davies², which were all shown to be of the type bipy·R₂SnX₂.

The ultra-violet absorption spectrum in dioxane indicated that the complex was dissociated into bipyridine and diphenyltin diisocyanate. The bipyridine band³ at 284 mμ showed no splitting and was in the same position as that shown by the free base in dioxane; bipy·Ph₂SnBr₂ showed identical behaviour. Okawara⁴ has recently shown that bipy·Bu₂SnCl₂ is dissociated in a number of solvents. Since dioxane is the only solvent in which the diisocyanate complex has appreciable solubility, this dissociation precluded molecular weight measurements.

The adduct can be formulated with either bridging bipyridine groups, or bridging isocyanate groups; the latter possibility seems unlikely since the NCO asymmetric

stretching band was found at the normal⁵ position of 2200 cm^{-1} and molecular weight determinations on other organotin isocyanates have shown these to be monomeric in a variety of solvents. The fact that no comparable adduct could be obtained with 1,10-phenanthroline also supports this view.

Another 1:2 bipyridine adduct reported recently⁶ was $\text{bipy} \cdot (\text{Ph}_2\text{BCl})_2$ but this compound was shown to have the ionic structure $[\text{Ph}_2\text{B} \cdot \text{bipy}]^+ [\text{Ph}_2\text{BCl}_2]^-$ with the 2,2'-bipyridine fulfilling its normal role as a chelate group. The diisocyanate adduct, on the other hand, has none of the properties of an ionic compound, as already noted it dissociates in dioxane giving free bipyridine and its solutions in nitromethane were found to be non-conducting.



It is therefore concluded that this compound has structure (I), with tin showing the not unusual⁷ coordination number of five and appears to be the first example of a compound containing a bridging 2,2'-bipyridine group.

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