N-Mercuricarbamates

By ALWYN G. DAVIES and G. J. D. PEDDLE

(*William Ramsay and Ralph Forster Laboratories, University College, London, W.C.*1)

THE addition of trialkyltin alkoxides to alkyl and aryl isocyanates to give *N*-stannylcarbamates (II) has been described, and it was suggested that reactions of this type would be found to be common to the alkoxides of many other metals.[1] We now report a similar reaction of mercuric alkoxides to give *N*-mercuricarbamates.

Mercury dimethoxide adds rapidly to phenyl isocyanate giving methyl *N*-mercuri-*N*-phenylcarbamate (I; 65% yield) as pale yellow crystals, m.p. 188—189° [$\nu_{C=O}$ 1708 cm.$^{-1}$, *cf.* 1655 and 1690 cm.$^{-1}$ for $Bu_3Sn{\cdot}NPh{\cdot}CO_2Me$ (II)]. Measurements of the apparent molecular weight show that some dissociation occurs in benzene and in chloroform at 25°.

$$\begin{array}{ccc} Hg(OMe)_2 + PhNCO & & HgCl_2 + NaNPh{\cdot}CO_2Me \\ & \searrow \quad \swarrow & \\ & Hg(NPh{\cdot}CO_2Me)_2 \quad (I) & \\ & \downarrow (Bu_3Sn)_2S & \\ & HgS + Bu_3Sn{\cdot}NPh{\cdot}CO_2Me \quad (II) & \end{array}$$

The same mercuricarbamate (I) can be prepared from mercuric chloride and the sodium derivative of methyl *N*-phenylcarbamate, and it reacts with bis(tributyltin) sulphide to give the stannylcarbamate (II), supporting the formulation (I).

Mercury dimethoxide similarly reacts with butyl isocyanate to give methyl *N*-butyl-*N*-mercuricarbamate (m.p. 84—86°; 47% yield). Phenyl isothiocyanate under the same conditions gives the adduct (III) as white crystals, m.p. 97—98°; this compound has two strong bands at 1617 and 1584 cm.$^{-1}$, suggesting the presence of the C=N rather than the C=S group (structure III).

$$Hg(OMe)_2 + PhNCS \rightarrow [PhN:C(OMe)S]_2Hg \quad (III)$$

Phenylmercury methoxide likewise adds exothermically to phenyl isocyanate giving (54% yield) methyl *N*-phenyl-*N*-phenylmercuricarbamate, $PhHg{\cdot}NPh{\cdot}CO_2Me$, m.p. 127·5—128·5°.

These mercuricarbamates are much less susceptible to hydrolysis than are the corresponding stannylcarbamates. Methyl *N*-butyl-*N*-mercuricarbamate decomposes slowly in the air, but the mercuri-compounds derived from phenyl isocyanate and phenyl isothiocyanate were unchanged after 1 year.

(*Received, February* 10*th*, 1965.)

[1] Bloodworth and Davies, *Proc. Chem. Soc.*, 1963, 264.