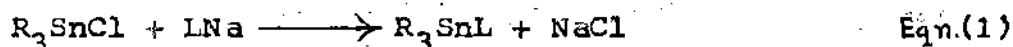


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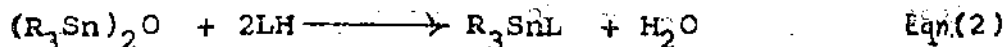
The thesis consists of four chapters. The first chapter attempts to present an overview of the organotin chemistry with particularly emphasis on the bonding and structure in organotin compounds.

The second chapter gives a brief account of the organotin alkoxides, phenoxides and related compounds.

The third chapter deals with the (i) preparation of the arylazophenols used as ligands in the present study, (ii) the reactions of the ligands with the triorganotin oxides, $(R_3Sn)_2O$, and (iii) preparation of the triorganotin derivatives, R_3SnL (LH = aryl azo phenol), using the reaction:



The results presented in this chapter shows that the aryl azo phenols do not undergo the normal reaction (eqn. 2) with $(R_3Sn)_2O$.



Azeotropic distillation or use of dessicants has no effect.

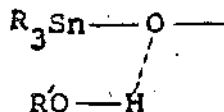
On the other hand, prolonged refluxing of mixtures of stannoxanes with the arylazo phenols produced infusible (m.p) $300^\circ C$) and sparingly soluble organotin derivatives with empirical formula of $RLSn(OH)_2$. The yields are quite low and the period of refluxing varied considerably (from ~ 12 hours to ~ 72 hours). In

some cases, no reaction took place.

The aryl azo phenols with a nitro substituents, e.g. 4'--(4-hydroxy benzene azo) nitrobenzene, because of their higher acidity, form the Na/K salt easily which could be reacted with R_3SnCl to yield the triorganotin derivatives, R_3SnL . These compounds are crystalline in nature with well defined melting points and are soluble in common organic solvents. The compounds are stable in air.

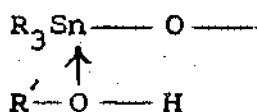
The last chapter deals with electronic and IR spectral studies on the ligands and the organotin derivatives.

The electronic spectral studies show that the acidity of the -OH group in the ligands are very low except in the nitro substituted compounds and, therefore, the stannoxanes fail to react via the transition complex I.



I

The Lewis acidity of the organotin compound takes a dominant role under this situation and reaction can proceed through nucleophilic attack at the tin atom (II).

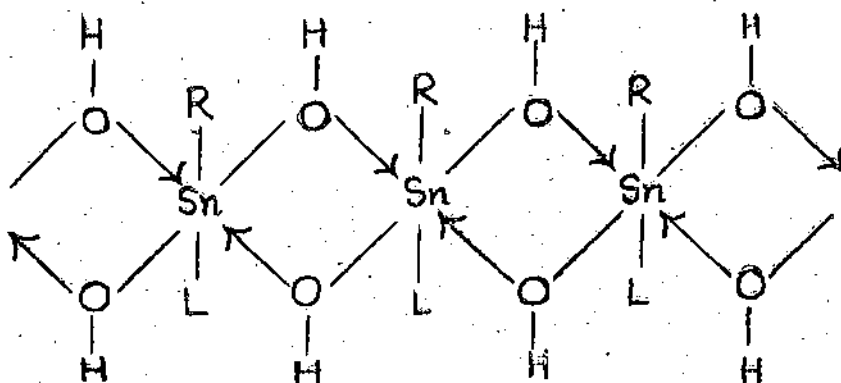


II

As a result, instead of the expected reaction (eqn. 2), polymeric products formed through the cleavage of R-Sn bonds are obtained.

The IR studies show the presence of $\nu(\text{Sn-O})$ absorption in the R_3SnL derivatives around $\sim 570 \text{ cm}^{-1}$, $\nu(\text{C-O})$ of the ligand is slightly lowered in the organotin compounds in some cases.

The IR spectra of the products $\text{R}_2\text{Sn}(\text{OH})_2$, are characterised by broad band in the $\sim 500-600 \text{ cm}^{-1}$ region due to $\nu(\text{Sn-O})$ and very broad absorption around $\sim 3400-3500 \text{ cm}^{-1}$ indicating involvement of the -OH groups in inter molecular coordination. On the basis of available information $\text{R}_2\text{Sn}(\text{OH})_2$ compounds are represented as follows:



III