

S U M M A R Y

Organotin compounds, apart from their interesting structural features, possess a number of versatile applications. These are currently being used as PVC stabilisers, pesticides, anti fouling agents, wood preservatives, molluscicides etc. As a consequence, organotin chemistry has attracted wide attentions of chemists and a vast literature concerning the varied aspects of organotin chemistry is recently available. During last few decades, organotin co-ordination complexes are being vigorously investigated by a large number of workers.

In the beginning, a short review of the organotin co-ordination complexes has been discussed. Organotins can form a number of adducts and complex compounds with different types of ligands e.g. Biglyridyl, o-phenanthroline, oximes and Schiff bases, diphenyl thiocarbazones, β -hydroxy quinolines, β -diketonos, pyridine carboxylic acids etc.

After this short review, experimental details of the present investigation have been given. First, the preparations of two new hydroxamic acid derivatives of oxalyl chloride have been described. These two new ligands viz., oxalyl bis-*o*-phenyl hydroxamic acid and oxalyl bis-*n*-p-tolyl hydroxamic acid have been characterised by elemental analysis, i.r., u.v., p.m.r. and mass spectra and also by some colour reactions with different metal cations.

(IV)

Subsequently, the preparations of some known compounds, which are required for the present investigations have been reported. These compounds are prepared by literature methods with suitable modifications, where necessary.

The preparation of sixteen new organotin compounds with oxalyl bis-*n*-phenyl hydroxamic acid and oxalyl bis-*n*-*p*-tolyl hydroxamic acid have been reported in the present investigations. These compounds have been characterized by elemental analysis, u.v., i.r., p.m.r. spectra and in some cases by molecular weight determinations. All the triorganotin derivatives of oxalyl bis-*n*-phenyl hydroxamic acid and oxalyl bis-*n*-*p*-tolyl hydroxamic acid, are of the type $(R_3Sn)_2 \left[\begin{array}{l} \diagup \\ \diagdown \end{array} \right] R = ph, tu, Li_2 = \text{oxalyl bis-}n\text{-phenyl hydroxamic acid; } R = ph, tu, cyclohexyl, Li_2 = \text{oxalyl bis-}n\text{-}p\text{-tolyl hydroxamic acid} \left[\begin{array}{l} \diagdown \\ \diagup \end{array} \right]$ and prepared by azeotropic distillation of water from a mixture of bis-(triorganotin) oxide and ligand in 1:1 molar ratio. Some diorganotin derivatives of these two ligands are also prepared by the same procedure and have been found to be of the type $(R_2Sn)_2 \left[\begin{array}{l} \diagup \\ \diagdown \end{array} \right] R = ph, tu, me, Li_2 = \text{oxalyl bis-}n\text{-phenyl hydroxamic acid; } R = bs, bu, ph, me, Li_2 = \text{oxalyl bis-}n\text{-}p\text{-tolyl hydroxamic acid, } n = 2,3,4, X \left[\begin{array}{l} \diagup \\ \diagdown \end{array} \right]$. Another type of diorganotin compounds have been obtained and characterized as $\left[(R_2SnCl)_2 \right]_2 \left[\begin{array}{l} \diagup \\ \diagdown \end{array} \right] R = p\text{-tolyl, } Li_2 = \text{oxalyl bis-}n\text{-phenyl and oxalyl bis-}n\text{-}p\text{-tolyl hydroxamic acid} \left[\begin{array}{l} \diagdown \\ \diagup \end{array} \right]$. The only one mono organotin derivative of

(7)

the type $\left[(\text{MNO}_2)_2 \right]_n$ $\left[\text{R} = \text{bu}, \text{M}_2 = \text{oxalyl bis-} \textit{p}$ -tolyl hydroxamic acid, $n = \text{X} \right]$ have been obtained. All these organotin derivatives show a shift of the $\nu (\text{C} = \text{O})$ band to lower frequencies with a concomitant change in the $\text{N}-\text{O}$ frequencies. Also the $\nu (\text{-OH})$ frequency, due to intramolecular hydrogen bonding in the ligands at $3100-3200 \text{ cm}^{-1}$, is absent in the organotin compounds, showing the co-ordinated nature of these ligands. These compounds incidentally contain two organotin moieties in a single hydroxamic acid ligand, which have not been reported previously. The p.e.r. spectra of these organotin compounds show the shielding of ligand aromatic protons instead of deshielding which usually occurs due to drainage of electron density from the ligand moiety. This shielding effect of aromatic protons discloses some interesting structural features of these compounds.

In the latter part of the present investigations, twentyone new organotin derivatives of *p*-phenyl-*p*-chloro benzo hydroxamic acid and *p*-phenyl-*p*-nitro benzo hydroxamic acid have been discussed. Twelve organotin hydroxamates with *p*-phenyl-*p*-chloro benzo hydroxamic acid of the types R_2SnX_2 ($\text{R} = \text{me}$), R_2SnXL ($\text{R} = \text{bu}, \text{X} = \text{Cl}^-, \text{Br}^-, \text{OCH}^-, \text{OAc}^-$; $\text{R} = \text{me}, \text{X} = \text{Cl}^-, \text{OCH}^-, \text{OAc}^-$) and R_2SnXL_2 ($\text{R} = \text{bu}, \text{X} = \text{I}^-$; $\text{R} = \text{me}, \text{X} = \text{Br}$) and nine organotin compounds with *p*-phenyl-

(VI)

p-nitro benzohydroxamic acid of the type H_2O_2Nlg ($R = bu, ce$), H_2O_2NAl ($R = bu, X = Cl^-, Br^-, I^-, SCN^-$; $R = ce, X = Cl^-, Br^-, I^-$) have been prepared. Though some organic compounds with these two ligands have been reported previously, the p.m.r. spectra of these compounds have not yet been reported. The p.m.r. data of these compounds disclose some of their structural features, especially in the case of cis-trans isomers and have been discussed in the present work.