

## PRELIMINARY NOTE

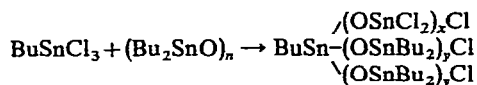
### Polymeric stannoxanes

Whereas dialkyldichlorosilanes can be hydrolysed to give polysiloxanes of controlled molecular weight, the hydrolysis of dialkyltin dichlorides gives first the distannoxane,  $\text{ClR}_2\text{Sn} \cdot \text{O} \cdot \text{SnR}_2\text{Cl}$ , and then the "infinite" polymer,  $(\text{R}_2\text{SnO})_n$  with no recognised compounds of intermediate molecular weight<sup>1</sup>.

Polystannoxanes of controlled size have now been prepared by telomerisation reactions between alkyltin chlorides and dialkyltin oxides. The basic reaction has been shown to be, formally, the insertion of a dialkyltin oxide unit between tin and chlorine<sup>2</sup>. By using the appropriate ratio of butyltin trichloride or dibutyltin dichloride, and dibutyltin oxide, the compounds shown in Tables 1 and 2 have been prepared; for the first series of compounds, the most symmetrical structures possible have been assumed. When the integers  $x$ ,  $y$ , or  $z$  are small, the products are probably unique oligomers, but higher values of  $x$ ,  $y$  and  $z$  may well represent averages derived from a mixture of polymers.

TABLE 1

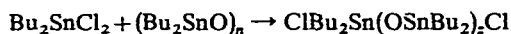
PRODUCTS OF THE REACTION



$x$	$y$	$m.p.$ (°C)
1	0	34-35
0	1	100-102
1	1	109-110
2	1	85-86
1	2	92-93
2	2	89-90
3	3	100-102
4	4	109-110

TABLE 2

PRODUCTS OF THE REACTION



$z$	$m.p.$ (°C)
1	109
2	89-90
3	94-95
4	90-92
5	100-102
6	178-180
9	ca. 140
12	ca. 178

The reagents were heated together in benzene or toluene until the dialkyltin oxide dissolved (0.5-8 h). The products were recovered from benzene, toluene, or light petroleum, usually as amorphous powders which tended to become waxy as the molecular weight increased. They were characterised by  $m.p.$ , analysis, and infrared spectra, and some by molecular weight; all showed a strong broad band between 670 and 690  $\text{cm}^{-1}$ , ascribed to the Sn-O-Sn asymmetric stretching vibration.

They were unchanged by brief exposure to the air, but all reacted rapidly with bipyridyl, giving, after recrystallisation,  $\text{Bu}_2\text{SnCl}_2 \cdot \text{bipy}$ .

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

ALWYN G. DAVIES  
P. G. HARRISON  
P. R. PALAN

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