Foreword

Although the first of the organotin compounds was synthesized over 140 years ago, their use in industry has only been realized some 100 years later—rising from 5000 tonnes worldwide in the late 1950s to 30 000–35 000 tonnes in 1980 and, subsequently, to 50 000 tonnes at the present time.

The less toxic organotin compounds (R_2SnX_2 and $RSnX_3$ types) account for almost 80% of the total world consumption; the other major application for these derivatives, as selective biocides and agrochemicals (R_3SnX types), has, over the last five years, experienced some environmental problems. These have involved the banning in most countries of the triorganotin compounds in marine antifouling paints for *small* boats and, in the UK, of bis(tributyltin) oxide (TBTO) and tributyltin naphthenate (TBTN) as fungicides in wood preservative formulations for household and remedial use. The restrictions, however, have not significantly affected the consumption of triorganotin biocides worldwide and, for example, in agriculture the triphenyltin fungicides and the tricyclohexyl- and trineophyl-tin miticides are still employed in many countries. The tetraorganotins (R_4Sn types), whilst having no large-tonnage commercial outlets, are important intermediates in the manufacture of the R_nSnX_{4-n} compounds (where $n = 1–3$) from anhydrous $SnCl_4$. These R_4Sn derivatives, additionally, find applications as co-catalysts for olefin metathesis reactions and, in the electronics industry, as precursors for the production of thin films of tin or SnO_2 on metal, glass and related substrates.

As far as the future is concerned, the high costs of registering new chemicals in many countries will hinder the development of large-tonnage applications for novel organotin compounds. Research efforts will therefore be concentrated on extending the uses of those organotin compounds which are already approved, e.g. by finding new systems for the existing organotin homogeneous catalysts, extending the approved organotin agrochemicals to combat diseases of a wide range of crops and applying organotin PVC stabilizers to other polymer formulations. For small-tonnage fine-chemical applications, promising new areas for organotins include potential antitumour and antiviral agents, drugs for controlling tropical diseases and intermediates in organic synthesis, particularly in carbohydrate chemistry.

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