Abstract

Aim of the first part of this work was the synthesis of new tin-containing multicentric Lewis acids as well as the study of their complexation behaviour towards neutral donor molecules such as DMSO, DMF and 1,3-dimethyl-imidazolidin-2-one.

Furthermore, the first bis(triiodostannyl)alkanes $I_3Sn(CH_2)_nSnI_3$ (n = 1, 3) as well as their DMSO and DMF complexes were synthesised.

In order to confirm the identity of the 20-membered ring *cyclo*-$CH_2[CH_2Sn(Cl_2)CH_2Si(Me_2)OSi(Me_2)CH_2Sn(Cl_2)CH_2]_2CH_2$, the latter was reacted with 4-dimethylaminopyridine to give the unexpected 4-dimethylamino-pyridinium $[\{\{[Sn(Cl)CH_2Si(Me_2)OSi(Me_2)CH_2Sn(Cl)](CH_2)_3\}_2O_2\}\{\{[Sn(OH)CH_2Si(Me_2)OSi(Me_2)\text{-}CH_2Sn(Cl)](CH_2)_3\}_2\text{-}O_2\}\cdot H_2O\cdot Cl]^-$. The molecular structure of this compound is characterised by two 20-membered rings linked together to form a double ladder structure.

Aim of the second part of this work was the synthesis of methylene-bridged double ladders.

A simple approach to assemble organotin oxo clusters is the hydrolysis of $[PhSn(I_2)]_2CH_2$ in a $MeOH/H_2O/NEt_3$ mixture affording in this way the oxo cluster $\{[Ph(HO)SnCH_2Sn(I)Ph]O\}_4$. Subsequent crystallisation of this derivative from different solvents afforded building blocks as solvent-adducts. On the other hand, crystallisation of this derivative from CH_3CN provided the solvent-free double ladder. The novel organotin oxo clusters crystallise as one- and two-dimensional polymers. Furthermore, the aptitude of the solvent to form hydrogen bonds is the factor that determines the structure and controls in the solid state the association of the organotin oxo cluster.