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SHORT COMMUNICATION

$2[(enH)_2O_2C\text{-}SO_3].SnPhCl_3$ AND $Cy_2NH_2O_2C\text{-}SO_3H.SnPhCl_3.H_2O$: SYNTHESIS AND INFRARED STUDY

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Abstract: By allowing $(enH)_2O_2C\text{-}SO_3$ (in water) and $Cy_2NH_2O_2C\text{-}SO_3$ (in ethanol) to react respectively with $SnPh_3Cl$ (in water) and $SnPh_2Cl_2$ (in ethanol) in specific ratios, the studied complexes are obtained. The suggested structures are discrete and tetrameric, the environment of the tin center being octahedral, the $O_2C\text{-}SO_3H^-$ anions behaving as a monodentate or a monochelating ligand.

Keywords: *monochelating, monomeric and tetrameric structures, $SnPhCl_3$ adduct, sulphate in situ*

INTRODUCTION

Many applications (industry, agriculture, medicine …) have been found in organotin (IV) family [1]. Many research groups have been focusing on synthesizing new molecules belonging to this family for both structural aspects and biological tests [2-7]. Our group has yet synthesized hundreds and hundreds of new molecules that were reported in many papers [8-15]. We present here the study of the interactions between $(enH)_2O_2C\text{-}SO_3$ (in water) and $SnPh_3Cl$ (in water), $Cy_2NH_2O_2C\text{-}SO_3$ (in ethanol) and $SnPh_2Cl_2$ (in ethanol) which have yielded the studied complexes. Infrared studies have been carried out and the structures were suggested based on the spectroscopic data.

EXPERIMENTAL

$(enH)_2O_2C\text{-}SO_3$ and $Cy_2NH_2O_2C\text{-}SO_3$ were obtained on neutralizing aminoimminomethane sulphonic acid respectively with ethylenediamine (en) and Cy_2NH in water in 1/1 ratio; yellow crystals are collected after a solvent evaporation at 60°C. When an aqueous solution of $(enH)_2O_2C\text{-}SO_3$ and ethanolic solution of $Cy_2NH_2O_2C\text{-}SO_3$ are allowed to react with aqueous solution $SnPh_3Cl$ and ethanolic solution $SnPh_2Cl_2$, clear solutions are obtained and stirred during two hours. When submitted to a slow solvent evaporation, these solutions yield respectively white crystals and a white powder.

The elemental analyses have been performed at the laboratory of Microanalyses at the University of Bath (UK). The elemental analyses data $^0/_0$ calculated ($^0/_0$ found) for **B :** $^0/_0$ **C:** 22.66 (22.70); $^0/_0$ **H:** 5.16 (5.84); $^0/_0$ **N:** 14.11 (14.37) for **A**; $^0/_0$ **C:** 36.36 (35.92); $^0/_0$ **H:** 5.10 (4.69); $^0/_0$ **N:** 2.23 (3.28), have allowed to suggest $2[(enH)_2O_2C\text{-}SO_3].SnPhCl_3$, and $Cy_2NH_2O_2C\text{-}SO_3H.SnPhCl_3.H_2O$ as formula.

The infrared spectra were recorded with a Perkin Elmer (4400 - 350 cm^{-1}) spectrometer (Dakar University), the sample being as nujol mulls while CsI windows were used. Infrared data are given in cm^{-1} – IR abbreviations: br (broad), (vs) very strong, (s) strong, (m) medium, (sh) shoulder, (vw) very weak.

All the chemicals were purchased from Aldrich and used without any further purification.

RESULTS AND DISCUSSION

Let us consider the infrared data:

- for **A:** νSO_3: 1074vs; $\nu_{as}CO_2 + \delta_s NH_3 + \delta_s NH_2$: 1620m, 1530w; ν(Ph): 728m, 695m; $\nu_s CO_2$: 1330w; ν(OH)+δ(OH): 3400br + 1560w;
- for **B:** νSO_3: 1060s; $\nu_{as}CO_2 + \delta_s NH_2$: 1631m, 1571m; ν(Ph): 733s, 695s; $\nu_s CO_2$: 1311w; ν(OH)+δ(OH): 3373br + 1555sh.

The existence of hydrogen bonds in compound **A** is explained by the presence of the broad band spreading from 2900 cm^{-1} to 3500 cm^{-1}. The suggested structure is discrete (Figure 1) in which the environment around the tin atom is octahedral. Thus, the axial positions are occupied by two monodentate $O_2C\text{-}SO_3^{2-}$ while the octahedral plan positions are occupied by three chloro atoms and the phenyl group. The non-coordinated oxygen atoms of the $O_2C\text{-}SO_3^{2-}$ anions are involved in hydrogen bonds with enH^+.

The broad absorption spreading from 2900 cm^{-1} to 3500 cm^{-1} indicates the existence of hydrogen bonds in the **B** compound. The suggested basic structure contains an anion chelating a $SnPhCl_3$ leading to a dimeric form through OH…O acetic acid hydrogen bond type which dimerize by cations through NH…O hydrogen bond-finally tetrameric (Figure 2).

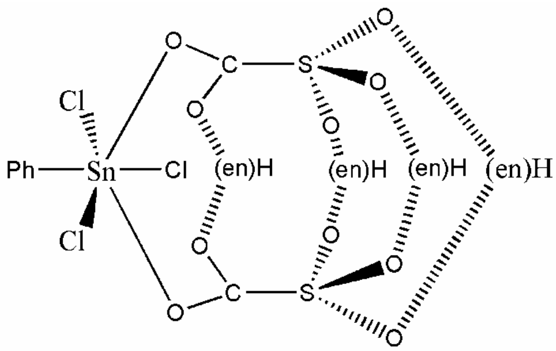

Figure 1. *Compound **A***

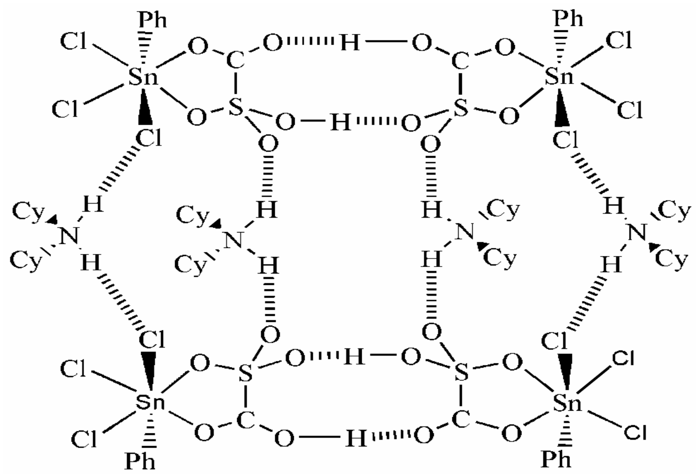

Figure 2. *Compound **B***

CONCLUSION

The studied adducts have discrete structure with monodentate and monochelating anion, the cations being involved in hydrogen bonding .The environment around the tin center is octahedral.

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