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SHORT COMMUNICATION

$Et_2NH_2C_6H_3(CO_2)_3SnBr_2 \cdot 4H_2O$: SYNTHESIS AND INFRARED STUDY

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Abstract: The title compound has been obtained on allowing $[C_6H_3(CO_2)_3(Et_2NH_2)_3]$ to react with $SnBr_4$. The molecular structure of $Et_2NH_2C_6H_3(CO_2)_3SnBr_2 \cdot 4H_2O$ has been determined on the basis of the infrared data. The suggested structure is a dimer in which each tin atom is hexacoordinated by two chelating $C_6H_3(CO_2)_3^{3-}$ anions and two Br atoms. $Cy_2NH_2^+$cations are involved through hydrogen bonds with non-coordinating CO_2 groups. The suggested structure is a cage.

Keywords: *cage, chelating, dimer, hexacoordinated, octahedral environment*

INTRODUCTION

Evans and Karpel [1] have stated various applications of the organotin (IV) compounds. This explains the focus of many research groups [2-9], including ours [10-11] in attempting to synthesize new molecules of tin family for further tests of biological interest. In this work, we have initiated the study of the interactions between $SnBr_4$ and $(Et_2NH_2)_3C_6H_3(CO_2)_3$ which has yielded $Et_2NH_2\ C_6H_3(CO_2)_3SnBr_2{\cdot}4H_2O$. The infrared study of this compound has been carried out and structure suggested on the basis of spectroscopic data.

EXPERIMENTAL

The infrared spectra was recorded by a FTIR-Nicolet (4000-400 cm^{-1}) spectrometer at the University of Addis Ababa (Ethiopia), the sample being as Nujol mulls, using CsI windows. The IR data are given in cm^{-1} [abbreviations: (br) broad, (vs) very strong, (s) strong, (m) medium, (sh) shoulder, (w) weak, (vw) very weak].
The elemental analyses have been performed at the laboratory of Microanalyses at the University of Bath (UK).
All the chemicals were purchased from Aldrich Chemical Company and were used without any further purification.

Synthesis of $Et_2NH_2C_6H_3(CO_2)_3SnBr_2{\cdot}4H_2O$

The complete neutralization of benzene-1,3,5-tricarboxylic acid with Et_2NH in water afforded the preparation of $[C_6H_3(CO_2)_3.(Et_2NH_2)_3]$ as a white powder after solvent evaporation at 60 °C. An aqueous solution of $[C_6H_3(CO_2)_3(Et_2NH_2)_3]$ was mixed with an ethanolic solution of $SnBr_4$ in 1/2 ratio and the clear solution formed was stirred for two hours. A white powder was obtained after a slow solvent evaporation.

The elemental analyse [% calculated (% found): C = 23.60 (24.69); H = 3.58 (3.64); N = 1.99 (2.22)], have allowed us to suggest the following formula: $Et_2NH_2C_6H_3(CO_2)_3SnBr_2{\cdot}4H_2O$.

RESULTS AND DISCUSSION

Let us consider the partial infrared data of the studied compound (in cm^{-1}):
$\nu_{as}CO_2^- + \delta NH_2$: 1720vs, 1609sh, 1566s; ν_sCO_2: 1343s.

The strong and broad absorption spreading from 2900 to 3500 cm^{-1} due to $\nu_{as}NH_2$ confirms the existence of the hydrogen bonds in this compound. Considering the water molecules as lattice ones, on the basis of these data the suggested structure is a dimer in which each tin atom is hexacoordinated by two chelating $[C_6H_3(CO_2)_3]^{3-}$ anions and two Br atoms. The two $Cy_2NH_2^+$ cations and the two oxygen atoms non coordinated from the $C_6H_3(CO_2)_3^{3-}$ anions are involved in hydrogen bonds. Thus, the whole structure is a cage as reported on Figure 1.

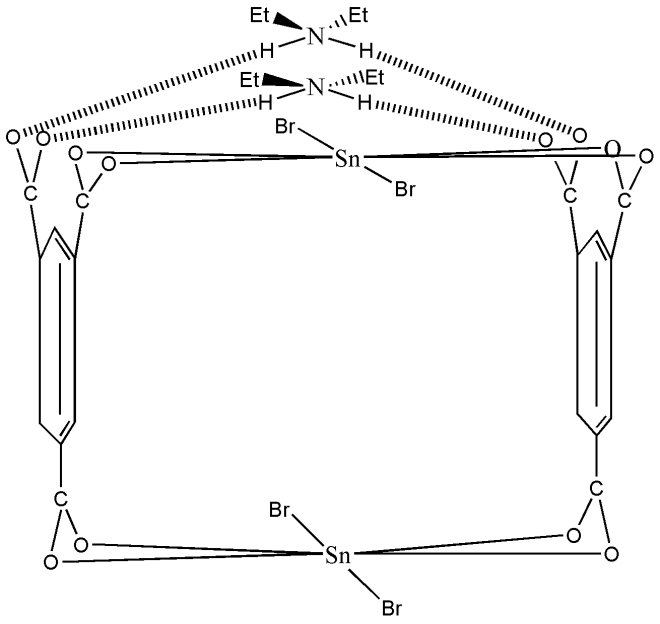

Figure 1

CONCLUSION

The studied complex is dimeric, the tin centre being hexacoordinated, the diethylammonium ion involved in hydrogen bonds and the anion tricarboxylato bichelating.

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