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Synthesis, structure and *in vitro* cytostatic activity study of the novel organotin(IV) derivatives of *p*-aminobenzenesulfonic acid

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Abstract

Four new *p*-aminobenzenesulfonate organotin complexes, $[(n\text{-Bu}_3\text{Sn})(\text{O}_3\text{SC}_6\text{H}_3\text{-NH}_2\text{-4})]_n$ (**1**), $[(n\text{-Bu}_2\text{Sn})_4(\text{O})_2(\text{OH})_2(\text{O}_3\text{SC}_6\text{H}_4\text{-NH}_2\text{-4})_2]$ (**2**), $[(\text{Me}_2\text{Sn})_4(\text{O})_2(\text{OH})_2(\text{O}_3\text{SC}_6\text{H}_4\text{-NH}_2\text{-4})_2]$ (**3**) and $[\{(n\text{-BuSn})_{12}\text{O}_{14}(\text{OH})_6\}(\text{O}_3\text{SC}_6\text{H}_4\text{-NH}_2\text{-4})_2 \cdot 3\text{C}_4\text{H}_8\text{O}_2]$ (**4**·diox), were synthesized by reaction of *p*-aminobenzenesulfonic acid with tributyltin oxide, dibutyltin oxide, dimethyltin oxide and monobutyltin oxide, respectively. These complexes were characterized by elemental analysis, FT-IR, NMR (^1H , ^{13}C , ^{119}Sn) spectroscopy as well as single-crystal X-ray diffraction. The crystal structure of complex **1** reveals that it is a 1D zig-zag chain structure and further interlinked into a 2D network by intermolecular interaction (N-H \cdots O). The structure analysis indicates that complexes **2** and **3** are the ladder-like structure including three alternate Sn_2O_2 rings, and further result in the formation of a 3D supramolecular architecture for **2** and a 2D supramolecular network for **3** by extensive hydrogen-bonding interactions (O-H \cdots O, N-H \cdots O). Complex **4** exhibits a dodecanuclear organooxotin cages, which are connected into a hydrogen-bonded 2D structure. Furthermore, complexes **1-4** were evaluated for their *in vitro* cytostatic activity against the human lung cancer cells (A549) and the human hepatocellular carcinoma cells (HepG-2). The preliminary screen shows that organotin derivatives with increasing number *n*-butyl group exhibits significantly higher cytostatic activity, and much higher than methyl group.

Keywords: organotin(IV); *p*-aminobenzenesulfonic acid; X-ray crystallography; characterization; *in vitro* cytostatic activity

1. Introduction

In recent years, organometallic self-assembly has become a powerful tool for the construction

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