

## Synthesis and structure of platinum complexes: $[\text{Ph}_4\text{Sb}]^+{}_2[\text{PtBr}_6]^{2-}$ , $[\text{Bu}_4\text{N}]^+{}_2[\text{PtBr}_6]^{2-}$ , $[\text{Ph}_4\text{Sb}(\text{DMSO})]^+[\text{PtBr}_5(\text{DMSO})]^-$ and $[\text{Bu}_4\text{N}]^+[\text{PtBr}_5(\text{DMSO})]^-$

© Vladimir V. Sharutin,<sup>\*†</sup> Olga K. Sharutina, Vladislav S. Senchurin, and Aleksey V. Guschin  
Department of Organic Chemistry. National Research South Ural State University. V.I. Lenin St., 76.  
Chelyabinsk, 454080. Russia. Phone: +7 (351) 267-95-70. E-mail: [vvsharutin@rambler.ru](mailto:vvsharutin@rambler.ru)

<sup>\*</sup>Supervising author; <sup>†</sup>Corresponding author

**Keywords:** complex, platinum, synthesis, structure.

### Abstract

Interaction pentaphenylantimony with hexabromoplatinumhydrogen acid in acetone and tetrabutylammonium bromide with potassium hexabromoplatinate in water followed by recrystallization from acetonitrile or acetone complexes were obtained  $[\text{Ph}_4\text{Sb}]^+{}_2[\text{PtBr}_6]^{2-}$  (**I**) and  $[\text{Bu}_4\text{N}]^+{}_2[\text{PtBr}_6]^{2-}$  (**II**), respectively. Recrystallization of **I** and **II** in DMSO leads to the formation of complexes  $[\text{Ph}_4\text{Sb}(\text{DMSO})]^+[\text{PtBr}_5(\text{DMSO})]^-$  (**III**) and  $[\text{Bu}_4\text{N}]^+[\text{PtBr}_5(\text{DMSO})]^-$  (**IV**). According to the date X-ray, antimony and nitrogen atoms in cations  $[\text{Ph}_4\text{Sb}]^+$  и  $[\text{Bu}_4\text{N}]^+$  have a distorted tetrahedral coordination (angles CSbC and bond lengths Sb-C are  $105.7(2)^\circ$ - $117.3(2)^\circ$  and  $2.095(6)$ - $2.102(5)$  Å, CNC angles in the eight crystallographically independent cations of complex **II** is  $105.7(5)^\circ$ - $113.1(6)^\circ$ ,  $107.4(4)^\circ$ - $112.7(5)^\circ$  – in **IV**, the bond lengths N-C  $1.499(9)$ - $1.529(9)$  (**II**),  $1.492(7)$ - $1.533(6)$  Å (**IV**). Coordination of Pt atoms in the anions of complexes **I** and **II** are close to ideal octahedral with angles BrPtBr  $88.10(2)$ - $91.90(2)^\circ$  (**I**) and  $88.12(3)$ - $91.47(3)^\circ$  (**II**), bond lengths Pt-Br  $2.4689(6)$ - $2.4798(5)$  Å (**I**) and  $2.4447(9)$ - $2.4731(8)$  Å (**II**). In the cation  $[\text{Ph}_4\text{Sb}(\text{DMSO})]^+$  complex **III** antimony atom has a trigonal-bipyramidal environment with the oxygen atom of dimethylsulfoxide ligand in axial position (Sb...O  $2.533(4)$  Å). Angles C<sub>e</sub>SbC<sub>e</sub> are  $114.46(19)^\circ$ - $120.37(19)^\circ$ , bond lengths Sb-C make up  $2.099(5)$ - $2.122(5)$  Å. Platinum atoms in the anions of complexes **III** and **IV** hexacoordinate, Pt-Br distances vary in the ranges  $2.4535(7)$ - $2.4708(6)$  Å (**III**) and  $2.4330(6)$ - $2.4724(6)$  Å (**IV**). Dimethylsulfoxide ligand is coordinated to the Pt atom a sulfur atom (Pt...S  $2.3552(5)$  Å (**III**),  $2.3280(18)$  and  $2.3398(18)$  Å (**IV**)).