# SUPRAMOLECULAR GERMANIUM COORDINATION COMPOUNDS WITH TARTARIC ACID, IRON AND 2,2-BIPYRIDINE

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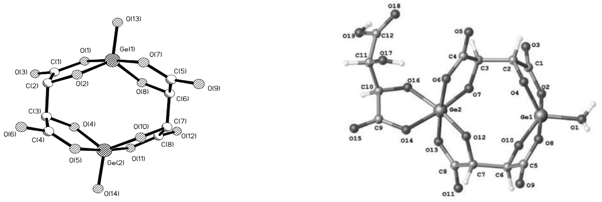
Directed synthesis of biologically active metal-organic supramolecular coordination compounds and development of the pharmacological agents on their basis is nowadays on the big interest to the most researches in the area of bioinorganic, biocoordination, medicinal chemistry.

A new supramolecular salt of the thermodynamically stable in solution tartratogermanate with N-containing biomolecule 2,2'-bipyridine was synthesized from the reaction media $GeO_2$ – $H_4Tart$ – 2,2′-bipyridine (bipy) – $H_2O$ for the first time. Results of the IR-studies were compared with the data of previously described supramolecular salts of diantipirilmethane, niacin, nicotinamide, piracetam, diphenylguanidine [1]. There are presented $\nu_{as}(COO^-) = 1679$ cm$^{-1}$, $\nu_s(COO^-) = 1420$ cm$^{-1}$, $\nu(Ge\text{-}O) = 717, 769$ cm$^{-1}$ stretching vibrations equally with $\nu(C\text{-}N) = 1346$ cm$^{-1}$ and $\nu(C\text{-}C)_{ring} = 1597, 1543$ cm$^{-1}$, which is typical for 2,2′-bipyridine. At the same time, $\nu(C{=}O)\sim1738$ cm$^{-1}$ is absent. These data indicate that compound $(Hbipy)_2[Ge_2(\mu\text{-}Tart)_2(OH)_2]\cdot 2H_2O$ (**I**) consists of the dimeric tartratogermanate anion same as in the previously described works (Fig. 1. a) [1] and protonated form of 2,2′-bipyridine.

From the reaction media $GeO_2$ – $H_4Tart$ – $FeSO_4$ – 2,2′-bipyridine compound $[Fe(bipy)_3]_2[\{Ge(H_2O)(\mu\text{-}Tart)_2Ge(H_2Tart)\}(S_2O_7)]\cdot 9H_2O$ (**II**) was obtained. According to the X-Ray analysis data, **II** is complex cation-anionic compound with $[Ge(H_2O)(\mu\text{-}Tart)_2Ge(H_2Tart)]^{2-}$ (Fig. 1. b) and $S_2O_7^{2-}$ anions, and two $[Fe(bipy)_3]^{2+}$ cations. Complex binuclear anion $[Ge(H_2O)(\mu\text{-}Tart)_2Ge(H_2Tart)]^{2-}$ contains two fully deprotonated ligands $Tart^{4-}$ and one non-bridge diprotonated $H_2Tart^{2-}$; Ge atoms have different type of coordination: distorted square pyramid (Ge1) and distorted octahedron (Ge2). Structure and composition of the new-synthesized compound is completely different from the previously described ones.



a b

Fig. 2. Structure of complex anions $[Ge_2(OH)_2(\mu\text{-}Tart)_2]^{2-}$ (a) and $[Ge(H_2O)(\mu\text{-}Tart)_2Ge(H_2Tart)]^{2-}$ (b)

Composition, form and structure of tartatic anions depends on the type of cation – protonated from of ligand (**I**) or complex cation of d-metal (**II**).

[1] Pesaroglo O.G., Martsinko E.E., Seifullina I.I. *Odessa National University Herald. Chemistry,* **2018***, № 23, 1(65),* 6-15.