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The various ligand complexes of platinum(II) with biologically active sulfur- and nitrogen-containing ligands

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Abstract

Complexation in various platinum(II) conditions with various sulfur-oxygen and nitrogen-oxygen containing ligands was studied for the first time. Individual and mixed-ligand platinum complexes with ethylenediamine diacetate and mercaptoacetic acid were obtained. With the help of IR and other physical methods, the methods of coordination of these ligands with the central atom have been studied. When synthesizing complexes, the selected conditions are optimal for individuality and high yield. It was found that in the complex $[Pt(EDDA)(NH_3)_2]Cl_2$, ethylene diamine diadiazate is bidentate at the nitrogen atom in the *cis*-position. Under these conditions, the carboxyl group of the ligand is not involved in complexation.

In the complex $[Pt(SCH_2COOH)_2(NH_3)_2]$ mercaptoacetic acid is coordinated monodentatno at the sulfur atom in trans positions. The carboxyl group of the ligand also does not participate in coordination. In the complex $[Pt(EDDA)(SCH_2COOH)_2]$ ethylene diamine diacetate in bidentate coordination form a five-membered metal-chelate cycle in the *cis*-position, this leads to the forced monodentate cis coordination of mercaptoacetic acid. In all synthesized complexes, the carboxyl group of ligands are not involved in coordination.

Study of the thermal behavior of synthesized complexes **I-III** showed that the decomposition of complexes depending on composition and structure occurs in different ways. The complexes are stable up to a maximum of 3150 °C. Cleavage of ligands occurs in two stages. Complex **II** is stable up to 315 °C, as evidenced by a clear area on the TG curve, and then the complex decomposes at high speed. The results of IR spectroscopy, elemental analysis, and molar electrical conductivity of the aqueous solution of the complexes are consistent with this coordination formula. To determine the antimicrobial activity of complexes **I-III**, various tests were used microbes from various systematic groups.

Biological tests of the activity of complexes **I-III** showed that there is a definite dependence of the activity of substances on their composition, concentration, contact time, and also the type of bacteria. The results of the tests showed that complex **III** exhibits the most selective antimicrobial activity.

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