

**SYNTHESIS, STRUCTURE AND PROPERTIES OF COORDINATION  
COMPOUNDS OF 3d-METALS 1,5-NAPHTHALENEDISULFONATES AND  
2-NAPHTHALENESULFONATES WITH THIOSEMICARBAZIDE**

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The anions of naphthalenesulfonic acids in recent decades have attracted the attention of many researchers as compounds on the basis of which the possibility of creating stable systems is realized due to the simultaneous effect of coordination interactions and hydrogen bonds. The interaction of cobalt(II), nickel(II), copper(II) and zinc(II) 1,5-naphthalenedisulfonates and 2-naphthalenesulfonates with thiosemicarbazide (Tsc) has been studied in this paper. Methods for the synthesis of complexes have been developed, the effect of solvent (water, ethanol), reagent ratios, and temperature on the products compositions has been studied. The composition and structure of the compounds formed are determined by chemical analysis, IR and diffuse reflection spectroscopy. For nickel(II), the change of the solvent results the formation of various complexes. In all cases, thiosemicarbazide is bidentate with coordination through sulfur and nitrogen. The thermal stability of the complexes has been studied by thermogravimetry. Thermostability decreases in the series of complexing agents:  $\text{Cu}^{2+} > \text{Zn}^{2+} > \text{Ni}^{2+} > \text{Co}^{3+}$ , and for 1,5-naphthalenedisulfonates it is higher than for 2-naphthalenesulfonates.

The structure of  $[\text{Cu}(\text{Tsc})_2](\text{Nds})$  and  $[\text{Zn}(\text{Tsc})_2](\text{Nds}) \cdot \text{H}_2\text{O}$  (Nds - doubly deprotonated anion of 1,5-naphthalenedisulfonic acid) was established by the X-ray diffraction method. In both cases, the structures consist of complex cations  $[\text{M}(\text{Tsc})_2]^{2+}$  ( $\text{M} = \text{Cu}$ , fig. 1,  $\text{M} = \text{Zn}$ , fig. 2) and anions  $\text{Nds}^{2-}$ , thiosemicarbazide is bidentate chelate (S, N). Coordination polyhedra: a square for copper and a distorted tetrahedron for zinc. For zinc, the compound contains crystallization water molecules. The structural units of both crystals are joined together by a branched network of hydrogen bonds.

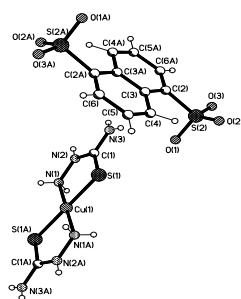


Fig. 1. The structure of compound  
 $[\text{Cu}(\text{Tsc})_2](\text{Nds})$

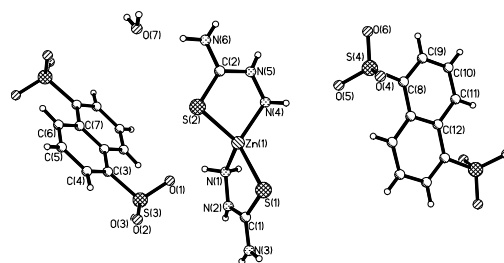


Fig. 2. The structure of compound  
 $[\text{Zn}(\text{Tsc})_2](\text{Nds}) \cdot \text{H}_2\text{O}$

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