

## Direct synthesis and isolation of complex compounds of Cu(II) nitrate and thiocyanate with 1-ethyltetrazole

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This work presents the results of the direct synthesis of complex compounds (CC) based on the interaction of 1-ethyltetrazole (L) with copper metal powder ( $\text{Cu}^0$ ) in the presence of ammonium salts:  $\text{NH}_4\text{X}$ , where  $\text{X} = \text{NO}_3^-$ ,  $\text{NCS}^-$ . The synthesis of CC was carried out in the medium of lower alcohols (methyl or ethyl) or acetonitrile. It was found that the best solvent for the synthesis of CC with a maximum yield (up to 70 %), in the case of  $\text{NH}_4\text{NO}_3$ , is a mixture of alcohols with triethyl formate in a volume ratio of 5:1, and for ammonium rhodanide – acetonitrile. The synthesis of CC was carried out by heating the reaction mixture to 60 °C with active mixing in the presence of oxygen in air. It should be noted that with the active bubbling of air through the reaction mixture, the dissolution time of copper metal powder ( $\text{Cu}^0$ ) is reduced by about two times. As a result of the slow concentration of solutions in air at room temperature, fine-crystalline complexes are formed, which are separated by filtration, washed and dried in air. Six previously undescribed CC of the composition:  $\text{CuL}_n\text{X}_m$ , where  $\text{X} = \text{NO}_3^-$ ,  $n = 1; 3; 4; 6$ ;  $m=2$  and where  $\text{X} = \text{NCS}^-$ ,  $n = 2; 6$ ;  $m = 2$  were synthesized and characterized. The isolated complex compounds were characterized by the methods of elemental analysis.  $\text{Cu}(\text{NO}_3)_2\text{L}_n$  with  $n = 1$  and 3 are linear polymers, while with  $n = 2$  and 6 they are complexes of the molecular (island) type. Similarly, in the case of complex compounds of copper rhodanide:  $\text{Cu}(\text{NCS})_2\text{L}_2$  is chain-type compound, and  $\text{Cu}(\text{NCS})_2\text{L}_6$  is island-type complex.