

Synthesis and investigation of transition metal coordination compounds with isomeric tetrazole Schiff bases

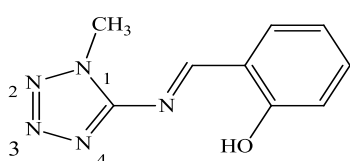
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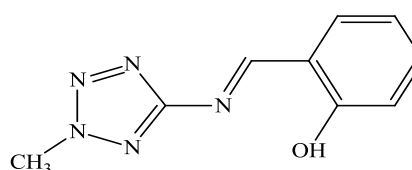
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Recent developments in coordination chemistry of transition metals are determined by application of complexes as novel multifunctional materials. Schiff bases present promising class of simple ligands which can ensure progress in the above area. Among Schiff bases tetrazole derivatives are unexplored ligands. The aim of the present study is the development of methods for synthesis of tetrazole based Schiff bases and their transition metal complexes.



2-(((1-methyltetrazol-5-yl)imino)methyl)phenol – **L¹**



2-(((2-methyltetrazol-5-yl)imino)methyl)phenol – **L²**

L¹ and **L²** were prepared by reaction of salicylic aldehyde with corresponding 5-amino-N-methyltetrazole in ethanol under argon [1]. Hydrated cobalt(II), nickel(II) and copper(II) chlorides were found to react with **L¹** and **L²** in EtOH–MeCN or MeOH–MeCN mixtures with formation of complexes MeX_nL_m of the following composition:

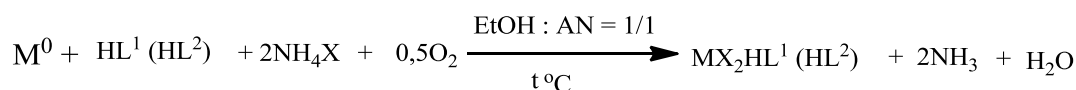
Me = Co, X = Cl, CH_3COO , $n = 2$, $m = 1$ or 2 ;

Me = Ni, X = Cl, $n = m = 2$; X = ClO_4 , $n = m = 4$;

Me = Cu, X = Cl, ClO_4 , BF_4 , $n = m = 2$.

The yield of these complexes was 70–80 %. Lower yields of target complexes were measured up when using individual solvents (EtOH, MeOH, MeCN).

Powdered cobalt, nickel and copper readily reacted with **L¹** and **L²** in DMSO or DMF in the presence of ammonium salts according to the following scheme:



where $\text{M}^0 = \text{Co}^0, \text{Ni}^0, \text{Cu}^0$; X = Cl^- , NCS^- , ClO_4^- ; L = **L¹** и **L²**.

Composition of perchlorate complex obtained is unusual since weakly coordinated perchlorate-anion facilitates to increase coordination capacity of metal cations.

Complexes obtained were characterized by means of elemental analysis, far (400–50 cm^{-1}) and middle (4000–400 cm^{-1}) IR spectroscopy, thermal analysis and powder X-ray diffraction. Expected structures of complexes are discussed based on data obtained.

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References

1. M. M. Degtyarik, S. V. Voitekhovich, Y. V. Grigoriev, V. N. Kokozay, A. I. Lesnikovich. *Abstracts XXVIth International Chugaev Conference on Coordination Chemistry. Kazan. Ru.* (2014) 239.