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SCIENTIFIC CONFERENCE OF YOUNG SCIENTISTS

Dedicated to the memory
of Academician Sabir Yunusovich Yunusov

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COMPLEX CONPOUNDS OF TRANSITION METALS WITH HYDRASONS OF MONOCARBONYL COMPOUNDS

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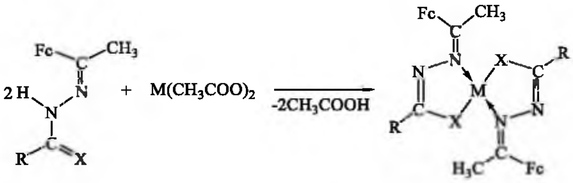
The existence of three donor atoms in the hydrazone molecules of ferrocene monocarbonyl compounds allows, in principle, their ambident coordination. The ability for tautomerism, geometric and configutational isomerism, as well as the possibility of substituting a mobile proton for a metal, testify to the broad complexing properties of these ligands.



M =Ni(II), Zn(II) и Cu(II): X=O: R=CH$_3$ (CuL$^1_2$, NiL$^1_2$, ZnL$^1_2$), C$_6$H$_5$ (CuL$^2_2$, NiL$^2_2$, ZnL$^2_2$), C$_6$H$_5$CH$_2$ (CuL$^3_2$, NiL$^3_2$, ZnL$^3_2$); X = S, R = NH$_2$ (CuL$^4_2$, NiL$^4_2$, ZnL$^4_2$).

According to the results of IR spectra, complex compounds based on monocarbonyl derivatives of ferrocene in the solid state have a flat-square planar structure. The IR spectra of all complex compounds obtained on the basis of the HL^1 ligand are very similar to each other. The interpretation of the IR spectra of the complexes shoved that the characteristic absorption bands of the free ligand at about 3270 cм$^{-1}$ $\nu_{(N-H)}$ are absent in the spectra of the complex compounds. This indicates enolization and deprotonation of ligands during coplexation. A single bandat 1536 cм$^{-1}$ in the NiL$^1_2$ complex corresponds to stretching vibrations of the N=C–O– system. In the spectrum of the complex, the low-intensity band at 1068 cм$^{-1}$ refers to $\nu_{(N-N)}$, which is shifted by 20 cм$^{-1}$ to the high-frequency region compared to the ligand spectrum. Zinc generallybforms complexes with a tetrahedral coordination sphere, but examples of square four-coordination sphere, but examples of square four-coordination zinc are rare. Zn(II) complex compounds were obtained in the same way as nickel(II) complexes. The IR spectrum of zinc largely coincides with the analogous IR spectrum of the NiL$^1_2$ complex. But it is also necessary to take into account the fact that the central Zn(II) ion, in comparison with Ni(II) ions, is distinguished by a high coordination elasticity. In our case with ligands HL^1–HL^4, such a distortion is impossible due to the formation of two five-membered metallocycles, and the coordination sphere of the complexing agent practically remains square-planar. Comparison of the fundamental vibrational frequencies of complex Ni(II), Zn(II) indicates that they are identical this was also confirmed by ^{1}H NMR spectroscopy. For Cu(II) complexes, this was proved by IR and EPR spektroskopy.

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