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SPECTRAL PROPERTIES OF TRANSITION METAL COORDINATION COMPOUNDS WITH HETEROCYCLIC ENAMINONITRILES

A series of 19 new enaminonitrile ligands (HL_{A-E}) based coordination compounds of general formulas $M(L^{A-E})_2$, (M = Cu^{2+}, Co^{2+}, Zn^{2+} and Ni^{2+}) were synthesized. The composition and structure of the complexes were determined based on CHN analysis, IR and ^{1}H NMR spectroscopy data. Absorption spectra in the UV region as well as fluorescence and excitation spectra were studied for the ligands and their coordination compounds at the room temperature. The obtained ^{1}H NMR spectra confirmed that the enaminonitrile ligands are coordinated to the metal ions in the deprotonated form. Compared to the lidands the absence of NH proton signal and strong field shifts of the other signals were observed in ^{1}H NMR spectra of Zn (II) complexes. The comparison of the FT-IR spectra of the heterocyclic ligands HL^{A-E} and all the complexes $M(L^{A-E})_2$ confirm the fact of ligands coordination in bidentate-chelate manner through the two nitrogen atoms: the first nitrogen of pyrrole ring and the second one from heteroaromatic substituent. The patterns of absorption bands displacement in the electronic spectra of coordinated enaminonitriles in the range of 200-500 nm has been analyzed. The most significant shift undergoes absorption band at 300-350 nm: ~ 10 nm red shift was observed for complexes $M(L^{A})_2$ and ~ 20 nm red shift for $M(L^{B-C})_2$, while for complexes $M(L^{D})_2$ a small blue shift ~ 5 nm was observed. The characteristics of the ligands and zinc (II) coordination compounds fluorescence have been investigated. It was shown that the all zinc (II) complexes were bright blue phosphors. However it should be noted that fluorescence intensity of compound $Zn(L^{E})_2$ was an order higher compared to the other studied zinc complexes.

Key words: heterocyclic ligands; enaminonitriles; 3d-metal complexes; fluorescence.