

Preparation of Some New Zn(II) Complexes Containing Mixed Ligands of Semicarbazones

Zuhoor Fathi Dawood¹ and Zeena Usama Jasim²

¹Department of Chemistry, College of Education, University of Mosul, Mosul, Iraq

²Department of Pharmaceutical Science, College of Pharmacy, University of Mosul, Mosul, Iraq

Abstract:

The reaction of benzil bis(semicarbazone) - BBSCH and other semicarbazone ligands (benzoin semicarbazone - BSH or 2-chlorobenzaldehyde semi- carbazone - CSH or 2-fluorobenzaldehyde semicarba- zone - FSH or furfuraldehyde semicarbazone - FrSH) with $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ or ZnCO_3 in 1:1:1 molar ratio affords mononuclear complexes of the general formula $[\text{Zn}(\text{BBSCH})(\text{LH})\text{X}]$ and $[\text{Zn}(\text{BBSC})(\text{L})]$ in neutral and basic medium, respectively (where LH= BSH, CSH, FSH or FrSH ; L= deprotonated LH ligands ; BBSC= deprotonated BBSCH ligand ; $\text{X}=\text{SO}_4^{2-}$ or CO_3^{2-}). The coordination of the ligands in the mononuclear complexes seems to occur via the N-azomethine and O-carbonyl groups. The resulted complexes have been characterized physico-chemi- cally, distorted octahedral structures have been suggested accordingly.

Key Words : Zinc complexes, mixed ligand, semicarbazone.

Introduction:

The coordination chemistry of zinc in both non-biological and biological areas has been the subject of intensive researches . In fact, the administ- ration of zinc to animals induce the synthesis of the proteins called metallothioneins, which play an important role in the metabolism of this element ^[1] . Zinc is the most common trace element and the only metal known to be required for at least one enzyme in each of the major classes of enzymatic activities . Zinc plays multifaceted roles in biological system^[2]

A good deal of work has been reported on the preparation and structural investigation of semi- carbazones and their complexes^[3-5] . This is due partially to their capability of acting as multidentate, NO, NNO, ONNO donor with the formation of either mono- or bi- or poly-nuclear complexes . In addition to their interesting ligational properties, semicarbazones and their complexes have important biological applications^[8-11] .

There has been growing interest in the formation of mixed ligand chelates involving ligands containing different donation sites such as sulfur , oxygen and nitrogen of different functional groups and transition metals of different oxidation states which can form stable complexes^[12] .

On the other hand , coordination compounds with mixed ligands are of considerable importance in the field of metalloenzymes and other biological activities^[11-13] . Hence , a large body of the coordination chemistry of mixed ligands with transition and non- transition metal ions have been reported recently^[14,15] .

Due to the importance of such ligands , we took a humble part in the chemistry of semi- carbazones and their complexes and some articles have been published

on their coordination chemistry with transition and non- transition metals^[16-18] .

In the present work , new zinc (II) complexes with mixed ligands benzil bis- (semicarbazone) and other semicarbazone ligands {benzoin semicarbazone – BSH , 2-chlorobenzalde- hyde semicarbazone – CSH , 2-fluorobenzaldehyde semicarbazone – FSH or furfuraldehyde semicarbazone - FrSH (figure 1)} have been prepared and characterized physico-chemically.

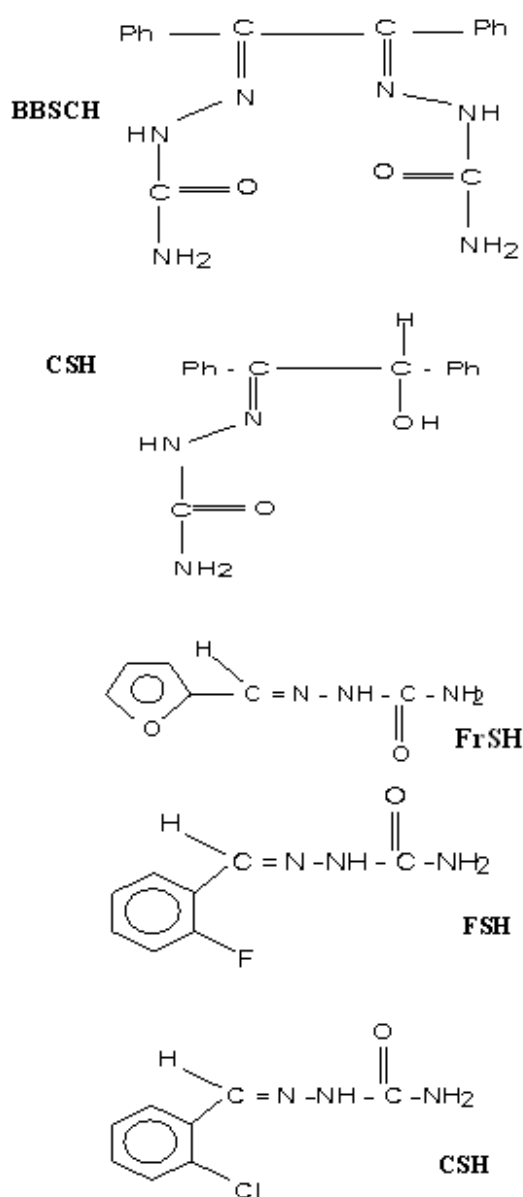


Fig.1 : Structures of the ligands

Experimental:

1. Chemicals

All the chemicals are used as supplied (BDH, Aldrich or Fluka) except furfuraldehyde which is used after purification by distillation.

2. Preparation of the ligands

Semicarbazones ligands have been prepared according to the Literature methods^[19,20]. Benzil bis(semicarbazone) has been prepared^[19] by refluxing 1:2 mole of benzil : semicarbazide hydrochloride and sodium acetate solution for about 3 hours. The semicarbazone thus formed has been filtered off from its cold solution, washed with distilled water and recrystallized from ethanol. Whereas, the ligands BSH, CSH, FSH and FrSH have been prepared^[20] by refluxing equimolar

quantities of the semicarbazide hydrochloride and the corresponding aldehyde. Same procedure has been followed as above.

3. Preparation of zinc(II) complexes

I. Neutral medium

Complexes of the type $[Zn(BBSCH)(LH)X]$ (where LH = BSH, FSH, FrSH or CSH) have been prepared by the reaction of 0.5g (0.0018 mole) $ZnSO_4 \cdot 7H_2O$ or 0.5g (0.0040 mole) $ZnCO_3$ with 50 ml ethanolic solution of benzil bis(semicarbazone) and the other semicarbazone ligands in 1:1:1 molar ratio (amounts in grams are listed in Table 1). The mixture has been refluxed for 3 hours, evaporated to about half their volumes and cooled. The resulting products have been filtered off, washed with cold petroleum ether and dried.

Table 1: Physical properties and analytical data of the free ligands and their complexes

No	Compd.	wt of BBSCH	wt of LH	%yield	Medium	Color	m.p or d* °C	Λ_M^{**}	Relative M.wt Cal./(obs.)	%analysis Cal./(obs.)	
										Zn	SO_4^{2-}
	BBSCH	-----	-----	-----	-----	White	233	-----	324.00	-----	-----
	BSH	-----	-----	-----	-----	Ecreu	173	-----	269.00	-----	-----
	CSH	-----	-----	-----	-----	Ecreu	280d	-----	197.50	-----	-----
	FSH	-----	-----	-----	-----	White	240d	-----	181.00	-----	-----
	FrSH	-----	-----	-----	-----	Honey	214	-----	153.00	-----	-----
1	$[Zn(BBSCH)(BSH)CO_3]$	0.50	0.43	61.10	Neutral	Orange	242d	2.9	714.00 (635.22)	9.10 (9.08)	-----
2	$[Zn(BBSC)(BS)]$	0.50	0.43	61.30	Basic	Orange	174	8.2	655.00 (617.70)	9.92 (9.09)	-----
3	$[Zn(BBSCH)(CSH)CO_3]$	0.50	0.24	98.00	Neutral	Ecreu	188	2.9	647.00 (694.20)	10.05 (11.11)	-----
4	$[Zn(BBSC)(CS)]$	0.50	0.24	62.76	Basic	Honey	198d	5.3	585.00 (528.20)	11.11 (11.13)	-----
5	$[Zn(BBSCH)(FSH)CO_3]$	0.50	0.31	52.33	Neutral	Honey	200d	2.4	630.00 (687.70)	10.32 (10.02)	-----
6	$[Zn(BBSC)(FS)]$	0.50	0.31	79.70	Basic	Pale yellow	254d	25.6	568.00 (492.50)	11.44 (10.02)	-----
7	$[Zn(BBSCH)(FrSH)CO_3]$	0.50	0.29	87.70	Neutral	Honey	214	4.9	562.00 (512.80)	11.57 (10.00)	-----
8	$[Zn(BBSC)(FrS)]$	0.50	0.29	50.00	Basic	White	182	8.0	500.00 (517.00)	13.00 (12.03)	-----
9	$[Zn(BBSCH)(BSH)SO_4]$	0.56	0.47	91.50	Neutral	Honey	228d	19.8	753.00 (732.60)	8.63 (8.30)	12.75 (12.70)
10	$[Zn(BBSC)(BS)]$	0.56	0.47	84.10	Basic	Ecreu	270d	18.6	655.00 (586.00)	9.92 (8.32)	-----
11	$[Zn(BBSCH)(CSH)SO_4]$	0.56	0.27	98.00	Neutral	Ecreu	222	5.3	683.00 (687.70)	9.52 (10.01)	14.06 (15.00)
12	$[Zn(BBSC)(CS)]$	0.56	0.27	90.90	Basic	Honey	214d	3.7	585.00 (558.00)	11.11 (10.01)	-----
13	$[Zn(BBSCH)(FSH)SO_4]$	0.56	0.35	98.00	Neutral	Honey	212	11.2	666.00 (687.00)	9.76 (9.99)	14.41 (14.06)
14	$[Zn(BBSC)(FS)]$	0.56	0.35	73.90	Basic	White	232d	26.0	568.00 (547.00)	11.44 (10.04)	-----
15	$[Zn(BBSCH)(FrSH)SO_4]$	0.56	0.32	98.00	Neutral	Honey	228	3.8	598.00 (575.00)	10.87 (9.95)	16.05 (16.00)
16	$[Zn(BBSC)(FrS)]$	0.56	0.32	96.00	Basic	White	224d	5.2	500.00 (485.94)	13.00 (12.40)	----

* d = decomposition temp; ** Λ_M = molar conductivity in $\Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$

II. Basic medium

Complexes of the type $[Zn(BBSC)(L)]$ (where L = deprotonated LH ligands) has been prepared by the reaction of 0.5g (0.0018 mole) $ZnSO_4 \cdot 7H_2O$ or 0.5g (0.0040 mole) $ZnCO_3$ with benzil bis(semicarbazone) and other semicarbazone ligands in 1:1:1 molar ratio (amounts in grams are listed in Table 1). Ethanolic

solution of sodium hydroxide (1M) has been added to the mixture until pH~8-9. The products have been filtered off, washed with cold petroleum ether and dried.

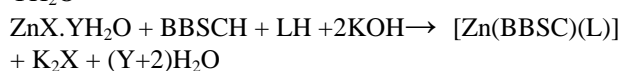
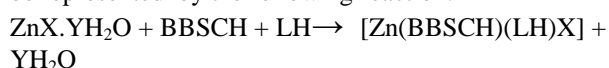
4. Analytical and physical measurements

All the complexes have been decomposed with concentrated nitric acid for analytical purposes^[21]. Zinc content has been determined using Pye-Unicam SPg

atomic absorption spectrophotometer (Philips) . Sulphate content has been determined by applying nephelometric method^[19] using CE 1021 ultraviolet and visible spectrophotometer , Cecil instruments Limited Co., England. Molar conductivities of the complexes have been measured using 10⁻³ M dimethylsulfoxide solution at 25 °C by Jenway PCM₃ . The infrared spectra has been recorded on FT-IR Bruker type Tensor 27 in the range 400-4000 cm⁻¹ using KBr pellets . Electronic spectra has been recorded by Shimadzu / UV Probe type UV-1601 for 10⁻³ M solution of the ligands and their complexes in dimethylsulfoxide at 25 °C. Relative molecular weights of the complexes have been determined cryoscopically.^[22] .

Results and Discussion:

The reaction of zinc salts with benzil bis-(semicarbazone) and the other semicarbazone ligands in 1:1:1 molar ratio in both neutral and basic medium may be represented by the following reaction:



(where X=SO₄²⁻ or CO₃²⁻ ; Y=7 or zero ; LH= BSH , CSH , FSH , FrSH ligands ; L= deprotonated LH ligand ; BBSC= deprotonated BBSCH ligand).

The resulted complexes are solids, soluble in dimethylsulfoxide and dimethylformamide. The elemental composition and the relative molecular weight determinations of the complexes are clearly assigned to 1:1:1 molar ratio of zinc salt : benzil bis(semicarbazone : other semicarbazone ligands (LH). The values of the molar conductivities (2.4-19.8 Ω⁻¹ cm² mol⁻¹) approach those for non-electrolytes for complexes prepared in neutral and basic medium^[23] (Table 1).

The infrared spectra of BBSCH and LH ligands shows a strong band at 1685 and 1680 cm⁻¹, respectively, due to ν_{C=O}. On coordination , this bands splits into two peaks, in case of BBSCH ligand , one appears at the same position and the other peak observes at lower frequency (Table 2) indicating the formation of chelation between the oxygen of only one C=O group and the metal ion , whereas the band in case of LH ligands shifts towards a lower frequency indicating chelation of C=O group to the metal ion^[6,16] in neutral medium . While in basic medium , this band has been disappeared and a new band is observed at 1188 - 1350 cm⁻¹ due to ν_{C-O} thereby establishing the coordination of the ligands through the enolic oxygen atom^[7, 17] . The appearance of strong bands at 1630 - 1635 cm⁻¹ and 1560 – 1570 cm⁻¹ which are attributed to ν_(C=N) + ν_(O-C=N) and azine chromophore ν_(C=N-N=C) , respectively, support the formation of enolic structure in basic medium^[7,18] . The next strong band at 1580 cm⁻¹ which is attributed to C=N group shifts towards a lower frequency on coordination due to the decrease of the bond order as a result of metal nitrogen bond formation^[6,7] . The position of the ligands at 3203 – 3219 cm⁻¹ is assigned to ν_{NH} , on complexation , it is more complicated due to different factors (such as the effect of coordination and presence of other groups appeared in the same region) . This band , however , is remained unaltered in the complexes prepared in neutral medium indicating that there is no coordination through this group^[6,18] . Meanwhile , in basic medium , because of the presence of hydrogen bonding it is more difficult to notice the absence of NH group , but it is well known that this band is disappeared in basic medium^[4,6,19] due to the formation of enolic form . The other strong bands at 3390 - 3410 and 1455 cm⁻¹ are assigned to ν_{NH2} and δ_{NH2}^[7,19] , respectively , remained unaltered on complexation indicating that there is no coordination through this group and the metal ion.

Table 2: Selected I.R. bands of the ligands and their complexes (values in cm⁻¹)

Compd.	νC=N semi.	νC=O Semi.	νC-O semi.	δNH ₂	νNH	νCO ₃ or	νSO ₄	νM-O	νM-N
BBSCH	1580	1685	-----	1455	3217	-----	-----	-----	-----
BSH	1580	1680	-----	1455	3217	-----	-----	-----	-----
CSH	1580	1680	-----	1455	3217	-----	-----	-----	-----
FSH	1580	1680	-----	1455	3217	-----	-----	-----	-----
FrSH	1580	1680	-----	1455	3217	-----	-----	-----	-----
1	1530, 1540	1640, 1650 1685	-----	1450	3217	1455, 1375	690, 703	470, 490	
2	1540, 1550	-----	1247, 1300	1450	-----	-----	702, 766	502, 584	
3	1530, 1540	1652, 1664 1685	-----	1450	3219	1455, 1375	650, 693	495, 525	
4	1541, 1558	-----	1330, 1350	1457	-----	-----	650, 669	419, 500	
5	1540, 1550	1650, 1670 1685	-----	1450	3203	1435, 1375	650, 691	500, 525	
6	1540, 1559	-----	1216, 1230	1450	-----	-----	614, 694	530, 590	
7	1540, 1557	1640, 1650 1685	-----	1450	3198	1435, 1375	613, 691	490, 524	
8	1530, 1550	-----	1250, 1275	1450	-----	-----	627, 721	489, 563	
9	1540, 1550	1630, 1664 1685	-----	1455	3198	1005, 1068 1120	691, 773	455, 589	
10	1540, 1550	-----	1188, 1220	1455	-----	-----	630, 650	455, 592	
11	1539, 1556	1634, 1651 1685	-----	1455	3198	1005, 1068 1120	617, 684	418, 456	
12	1550, 1560	-----	1310, 1330	1455	-----	-----	602, 695	489, 520	
13	1540, 1550	1640, 1650 1685	-----	1455	3198	1005, 1068 1120	615, 694	450, 520	
14	1540, 1556	-----	1220, 1230	1455	-----	-----	616, 695	490, 536	
15	1530, 1540	1650, 1662 1685	-----	1455	3198	1005, 1068 1120	622, 699	490, 563	
16	1550, 1564	-----	1220, 1283	1455	-----	-----	625, 697	492, 563	

The spectra of the complexes (1, 3, 5, 7) show bands at 1455 and 1375 cm⁻¹ indicating that the carbonato group

acts as monodentate ligand bonding to the metal ion through the oxygen atom^[19,24] . Meanwhile , there is no

band observed in the spectra of the complexes (2, 4, 6, 8) indicating the absence of this group in basic medium. The spectra of the complexes (9, 11, 13, 15) show three bands around 1005 cm^{-1} , 1068 cm^{-1} , and 1120 cm^{-1} due to SO group^[24] indicating that the sulphato group acts as monodentate ligand bonding to the metal ion through the oxygen atom^[24], whereas the complexes (10, 12, 14, 16) do not show any band indicating the absence of sulphato group in basic medium.

On the other hand the spectra of all the complexes show new bands around $418\text{--}592\text{ cm}^{-1}$ and $602\text{--}766\text{ cm}^{-1}$ due to $\nu_{\text{M-N}}$ and $\nu_{\text{M-O}}$ ^[24], respectively. The presence of these bands support the formation of the complexes under investigation.

In keeping with the closed subshell of group 12 (d^{10}) electronic configuration, the cation Zn^{2+} is colorless in aqueous solution. However, some of their compounds are colored. The presence of some ligands shift the energy of these charge transfer transitions from the ultraviolet (for the colorless materials) to the visible region of the spectrum. Compounds that owe their color to charge transfer transitions are very useful in practice (for pigments) because their absorptions are more intense than those of d-d transitions^[25].

The electronic spectral data of the ligands and their complexes are listed in Table 3. The ligands show two absorption bands in the regions $39063\text{--}44843\text{ cm}^{-1}$ and $27027\text{--}33333\text{ cm}^{-1}$ corresponding to $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions^[25], respectively. On complexation a blue shift has been observed due to the polarization in the $\text{C}=\text{N}$ bond caused by the metal-ligand electron interaction during the chelation^[26]. A new band is observed in the spectra of the complexes which can be related to additional transition involving metal and ligand orbitals indicating the participation of the ligand molecules in complexes formation.

Table 3 : Selected electronic spectral data of the ligands and their complexes (in cm^{-1})

Compd.	ν_1	ν_2	ν_3
BBSCH	40486	29070	-
FSH	39063	30769	-
CSH	39526	29412	-
BSH	39370	27027	-
FrSH	39216	29851	-
1	42373	30395	21322
2	43103	31056	21413
3	43478	32258	24691
4	42017	31746	24691
5	43478	31447	24631
6	42735	33333	24390
7	43290	31546	24570
8	43478	31646	21459
9	41494	29762	21459
10	43668	31250	21459
11	43860	30769	24570
12	42918	32154	24570
13	44843	31348	24438
14	42918	32573	23981
15	42373	30769	24570
16	43290	30769	21459

Conclusion:

According to the analytical, physical and spectral data, some observations have been achieved that lead to establish the following points:

I. BBSCH ligand acts as either tridentate or tetradentate chelating ligand joints to Zinc (II) ion either through the two azomethine nitrogen and one carbonyl group or the two azomethine nitrogen and the two enolic oxygen, in neutral or basic medium, respectively.

II. LH (BSH, CSH, FSH or FrSH) ligands act as bidentate chelating ligands joint to zinc (II) ion through the azomethine nitrogen and carbonyl oxygen atoms or the azomethine nitrogen and enolic oxygen atoms, in neutral and basic medium, respectively.

III. Zinc (II) ion is probably hexa-coordinated, leading to distorted octahedral geometry (figure 2).

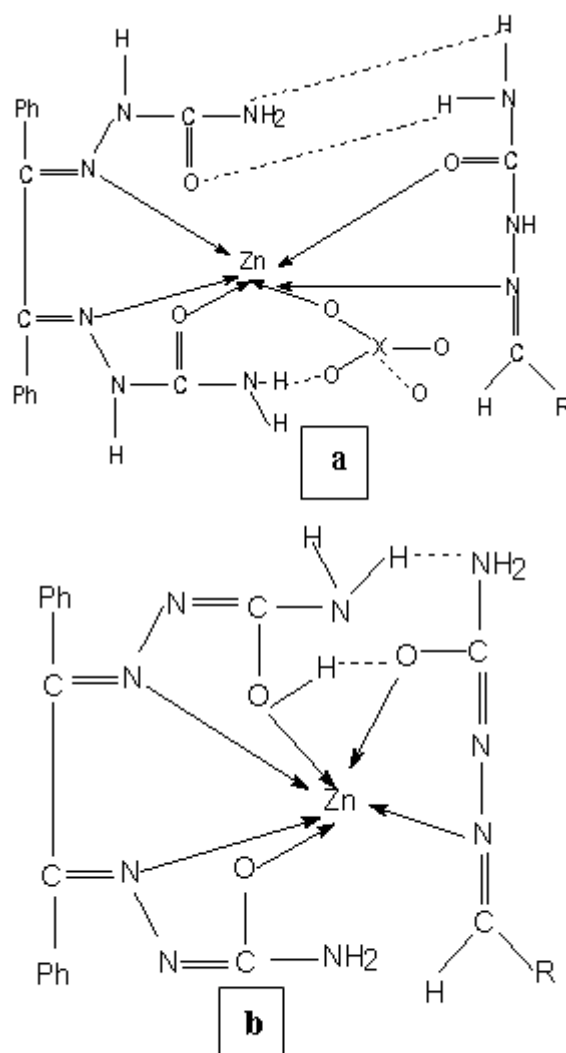
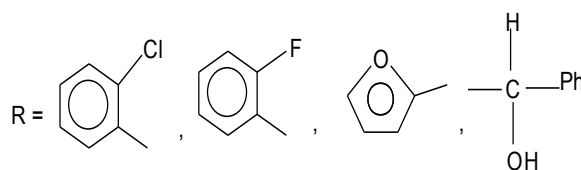


Fig.2 - Proposed Structures of the Complexes

(a)- in neutral medium ; (b)- in basic medium

X = S or C ; ---O = O or nothing ;



References:

1. Wilkinson G., Gillard R.D., and McCleverty J.A. (1987) . Comprehensive coordination chemistry , Pergamon Press, Headington Hill Hal, Oxford, England, Vol.5, p.926, 1021 .
2. Penner-Haha J.E., Kelly R.A., Tobin D.A., Weng T.C., and Fierk C.A. (2004) . Zinc-containing alkyl-transfer enzymes a new class of biological Zn site, 87th Canadian Chem. Conferences and Exhibition , 358, Hill- Gballroom W., Tartarus.
3. Gupta P., Basuli F., Peng S.M., Lee G. H. and Bhattachalaya S. (2003). Unprecedented chemical transformation of benzaldehyde semicarbazone mediated by osmium. *Inorg. Chem.*, 42 : 2069-2074.
4. Yin D. D., Wang Z. W. and Shan L. (2000). Synthesis and characterization of semicarbazone metal complexes of Sn(IV) and Zr(IV). *Chinese J. Chem.*, 18 : 364-367.
5. Sousa G. F., Valdece- Martinez J., Pérez G. E., Toscano R. A., Abras A. and Filgueiras C. A. L. (2002). Heptacoordination in organotin(IV) complexes, spectroscopic and structural studies of 2,6-diacetylpyridine bis(thiosemicarbazone)di-n-butyltin(IV) chloride nitromethane solvate $[nBu_2Sn(H_2dapsc)]Cl_2.MeNO_2$ and 2,6-diacetylpyridine bis(semicarbazone)dimethyltin(IV) trans-tetrachlorodimethylstannate (IV) , $[Me_2Sn(H_2dapsc)][Me_2SnCl_4]$. *J. Brazilian Chem. Soc.*; 13 : 559-564.
6. Kumar Y. and Tolani S. P. (1989). Pd(II), Pt(II), Rh(III), Ir(III) and Ru(III) complexes of some nitrogen-oxygen donor ligand. *Croatia Chem. Acta*; 62 , 73-79.
7. Kanoongo N., Singh R.V. and Tandon J. P. (1987) . Synthesis and structural studies of oxovanadium(V) complexes of semicarbazone. *Synth. React. Inorg. Met-Org. Chem.*; 17: 837-847.
8. Hurta F., Valko L., Valko M., Sijma J. and Košturiak A. (2001). Binuclear iron Fe(II) 3-semicarbazone-2,3-dioxindole complexes as potential organic ferromagnets . *Acta Phys. Slovaca*; 51: 281-285.
9. Patole J., Padhye S., Newton C.J., Anson C.E. and Powell A.K. (2004) . Synthesis, characterization and in vitro anticancer activities of semicarbazone and thiosemicarbazone derivatives of salicylaldehyde and their copper complexes against human breast cancer cell line MCF-7 . *Inorg. Chim. Acta*; 318 : 1654-1658.
10. Afrasiabi Z., Sinn E., Kulkarni P.P., Ambike V., Padhye S., Deobagakar D., Anson C.E. and Powell A.K. (2005) . Synthesis and characterization of copper (II) of 4-alkyl/ aryl-1,2-naphthoquinones thiosemicarbazone derivatives as potent DNA cleaving agents, *Inorg. Chem. Acta*, 358, 2023-2030.
11. Reddy K. H., Reddy P. S. and Babu P. R. (2000) . Nuclease activity of mixed ligand complexes of copper(II) with heteroaromatic derivatives and picoline. *Transition Metal Chem.*, 25 : 505-510.
12. El-ajaily M.M. and Maihub M. M. (2003) . Preparation and spectroscopic investigation of new mixed ligand chelates . *Jerash for Res.&Stud.*; 8 : 7-12.
13. Bindu P., Kurup M.R.P. and Satyakeerty T.R. (1998) . EPR, cyclic voltametric and biological studies of copper(II) complexes of salicylaldehyde N(4)substituted thiosemicarbazone and heterocyclic bases. *Polyhedron*, 18 : 321 .
14. Tsukahara V., Kamatani T., Suzuki T. and Kaizaki S. (2003) . A novel linkage isomeric pair of mixed ligand Ni(II) complexes with $IM2py-K^2,N,O$ and $IM2py-K^2,N,N$ modes in $[Ni(acac)(tmen)(IM2py)]^+$, synthesis and x-ray structure . *Dalton Transactions*, 7 : 1276-1279.
15. Hassan F.S.M. (2005) . Formation of mixed ligand complexes of Ni(II), Pd(II) and Pt(II) involving salicylidine – 3 – amino - 1,2,4 -triazole (Schiff base) as a primary ligand and cysteine as secondary ligand . *Arabian J. Sci. & Eng.*; 30 : 29-37.
16. Dawood Z.F. (2000) . New complexes of In(III) containing mixed ligands (semicarbazone and benzaldazine). *Sci & Tech.*; 14 : 47-50.
17. Dawood Z.F. (2002) . Zr(IV) complexes of some nitrogen oxygen donor ligands (semicarbazone and salicylaldazine). *Sci & Tech.*; 17 : 35-38.
18. Dawood Z.F., Hussein S.H. and Al-Shamaa M.A. (2004) . Some complexes of Ni(II) containing mixed ligands *Sci &Tech. A*; 21 : 71-75.
19. Mahmood Y.T. (2004). Preparation, characterization and radiolytical study of some copper (II) complexes containing mixed ligands, M. Sc. Thesis, Mosul Univ., P26 .
20. Vogel A.I. (1964) . Textbook of Practical Organic Chemistry, 3rd .ed. Longman Green, London, P.344.
21. Vogel A.I. (1981) . Textbook of Quantitative Inorganic Analysis, Longman Inc., New York, 4th .ed., p.784, 834
22. Danials J.W. (1962) . Experimental physical Chemistry, Mc Graw-Hill, 6th .ed., p 81 .
23. Geary W.J. (1971) . Use of conductivity measurements in organic solvents for the characterization of coordination compounds . *Coord.Chem. Rev.*, 7 : 81- 89.
24. Nakamoto K. (1976) . Infrared and Raman Spectra of Inorganic and Coordination Compounds, John Wiley and Sons, New York, 3rd .ed. p.222, 223 .
25. Shriver D.F., Atkins P. and Langford C.H. (1994) . Inorganic chemistry, W.H. Freeman and Company, New York, 2nd ed. , 352-355 .
26. Scott A.I. (1964) . Interpretation of the ultraviolet spectra of natural products, Pergamon Student Ed.

تحضير بعض المعقدات الجديدة للخارصين (II) الحاوية على مزيج من ليكاندات السميكاربازون

زهور فتحي داود¹ و زينة أسامة جاسم²

¹ قسم الكيمياء، كلية التربية، جامعة الموصل، الموصل، جمهورية العراق

² قسم العلوم الصيدلانية، كلية الصيدلة، جامعة الموصل، الموصل، جمهورية العراق

الملخص:

يتضمن البحث مفاعلة بنزل بس(سميكاربازون) - BBSCH وليكاندات سميكاربازون أخرى (بنزوين سميكاربازون-BSH أو 2 - كلوروبنزالديهايد سميكاربازون - CSH أو 2- فلوروبنزالديهايد سميكاربازون - FSH أو فورفورالديهايد سميكاربازون - FrSH) مع كبريتات الخارصين أو كاربونات الخارصين وبنسبة مولية (1 : 1 : 1) مكوناً معقدات أحادية النواة ذات صيغة عامة [Zn(BBSCH)(LH)X] و [Zn(BBSC)(L)] في كل من الوسطين المتعادل والقاعدي على التوالي (حيث BSH = LH أو CSH أو FSH أو FrSH ، L = الليكاندات LH مزال منها بروتون، أو BBSC = الليكاند BBSCH مزال منه بروتون ، X = SO₄²⁻ أو CO₃²⁻) تتناسق الليكاندات في المعقدات أحادية النواة عن طريق نترودجين الازوميثين وأوكسجين الكاربونيل. شخصت المعقدات الناتجة باستخدام تقنيات فيزيائية - كيميائية وإستناداً لذلك أقتُرحت تراكيب ذات شكل ثماني السطوح غير منتظم. الكلمات المفتاحية : معقدات الخارصين ، مزيج من الليكاندات، سميكاربازون.

يتضمن البحث مفاعلة بنزل بس(سميكاربازون) - BBSCH وليكاندات سميكاربازون أخرى (بنزوين سميكاربازون-BSH أو 2 - كلوروبنزالديهايد سميكاربازون - CSH أو 2- فلوروبنزالديهايد سميكاربازون - FSH أو فورفورالديهايد سميكاربازون - FrSH) مع كبريتات الخارصين أو كاربونات الخارصين وبنسبة مولية (1 : 1 : 1) مكوناً معقدات أحادية النواة ذات صيغة عامة [Zn(BBSCH)(LH)X] و [Zn(BBSC)(L)] في كل من الوسطين المتعادل والقاعدي على التوالي (حيث BSH = LH أو CSH أو FSH أو FrSH ، L = الليكاندات LH مزال منها بروتون، أو BBSC = الليكاند BBSCH مزال منه بروتون ، X = SO₄²⁻ أو CO₃²⁻) تتناسق الليكاندات في المعقدات أحادية النواة عن طريق نترودجين الازوميثين وأوكسجين الكاربونيل. شخصت المعقدات الناتجة باستخدام تقنيات فيزيائية - كيميائية وإستناداً لذلك أقتُرحت تراكيب ذات شكل ثماني السطوح غير منتظم.