

541.49+538.113+547.447.482.576.79

3d-

(Co, Ni, Cu, Zn)

02.00.01 -

- 2012



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«_____» _____ 2012

_____ 067.02.09

225. : 100174, . , , , .
(998-71) 214-52-36, : (998-71) 246-53-21, 246-02-24
-mail: muqaddas30@inbox.ru

«_____» _____ 2012 .

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Co(II), Ni(II), Cu(II) Zn(II)
1,3,4-

2.17.2.9.

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» (: 01.97.000.6218)

-3.9. «

-, -

2007) -3-142 «

» (2002-

2011).

»

(2007-

1,3,4-

1,3,4- ;
Co(II), Ni(II), Cu(II) Zn(II);

Co(II), Ni(II) Cu(II)

Co(II), Ni(II), Cu(II) Zn(II).

Cu(II)

(II), Ni(II), Cu(II) Zn(II).

MNDO PM3

o(II), Ni(II) Cu(II)

(II) 2-(2'- -)-1,3,4-

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” (, 2007), «

» (, 2009), III-

” (, 2010), XIX

“ -2010” (, 2010), “



” (, 2011), “

” (, 2011)

(, 2006-2011).

16 . 11 , 5

125 (133
, 16 22 ;
, 7 13 .

1,3,4- 3 - 2-(2'-)-1,3,4- (L¹), 5-
-2-(2'- -)-1,3,4- (L²), 5- -2-(2'-
-)-1,3,4- (L³),

7.0.

MNDO PM3

HyperChem

(.1).

1

	N(8) () d, ev	N(2) () d, ev	N(1) () d, ev	O () d, ev	H (OH) d, ev
L^1					
ND	-0.259	-0.081	-0.074	-0.247	0.205
3	-0,020	-0,008	-0,003	-0,224	0,206
L^2					
ND	-0,241	-0,137	-0,081	-0,248	0,203
3	-0.154	-0.082	-0.048	-0.254	0.226
L^3					
ND	-0.231	-0.141	-0.082	-0.254	0.201
3	-0.027	-0.100	-0,015	-0.227	0.204

Co(II), Ni(II), Cu(II) Zn(II)

L^{1-3}

L: 2:1

L^{1-3}

Zn(II); L¹ - 2-(2'-
(2'-
-)-1,3,4-
)-1,3,4-

: - Co(II) Ni(II), L¹⁻³₂ : - u(II)
)-1,3,4- , L² - 5- -2-
, L³ - 5- -2-(2'-
; - I, NO₃⁻ CH₃COO⁻.

Co(II), Ni(II), Cu(II) Zn(II)

L¹⁻³

=N

30-70['] -¹,

=N-N=

5-17⁻¹.

1610, 1616, 1630⁻¹ () 1610-1660⁻¹ ()
3350-3450⁻¹)

527-607⁻¹

430-499⁻¹

-N

(.2).

L¹⁻³

(⁻¹)

2

	v _s (C=N)	v _{as} (C=N)	v (=N-N=)	v (C-S)	v -	v (O-M)	v (N-M)
L ¹	1642	1509	1022	768	1616	-	-
ZnL ¹ Cl	1632	1488	1013	764	1621	545	439
C L ¹ NO ₃	1615	1491	1008	759	1624	557	430
NiL ¹ ₂	1633	1498	1013	754	1623	527	466
L ¹ ₂	1627	1495	1007	760	1629	551	436
L ²		1527	1028	725	1610	-	-
ZnL ² NO ₃	//	1561	1012	733	1649	589	459
C L ² Cl	//	1482	975	724	1660	545	439
L ² ₂	//	1497	977	720	1640	551	436
NiL ² ₂	//	1454	1020	752	1639	556	437
L ³	1570	1524	1046	754	1630	-	-
ZnL ³ NO ₃	1561	1513	1027	759	1649	590	486
ZnL ³ Cl	1539	1500	1029	755	1645	588	499
CuL ³ Cl	1548	1516	1035	758	1619	607	492
CoL ³ ₂ Cl ₂	1582	1533	1025	756	1641	580	474

C L²C₃

1381 755⁻¹

ZnL³NO₃ L³
728⁻¹

824⁻¹

1421 1383⁻¹

Ni(II)

Co(II)

Ni(II)

Cu(II) Zn(II)
1:2 M:L.

1:1 M:L,

Co(II)

L¹⁻³

Zn(II)

δ 9.58-9.86 . .

Zn(II) L¹⁻³
1,3-2.1 . .

δ

Co(II), Ni(II) Cu(II)
()

3.

NiL¹₂

⁴T₁(F) → ⁴A₂ ⁴() → ⁴A₂ 13673 c⁻¹ 16233

⁻¹.

Ni(II)



L^1 , 21650 cm^{-1} $^4 1()$
 CoL^1_2 13673 cm^{-1} 16233
 $^4 T_1(F) \rightarrow ^4 A_2$ $^4 () \rightarrow ^4 2$
 L^2 , 21650 cm^{-1} $^4 1()$ $Co(II)$

$Ni(II) \text{ c } L^2$
 13440 14706 cm^{-1} $^3 2 \rightarrow ^3 1(F)$
 20000 cm^{-1} $(^1 \rightarrow ^3 1)$
 $Ni(II) \text{ L}^2$ $(.3)$

$Ni(II) \text{ c } L^2$

3

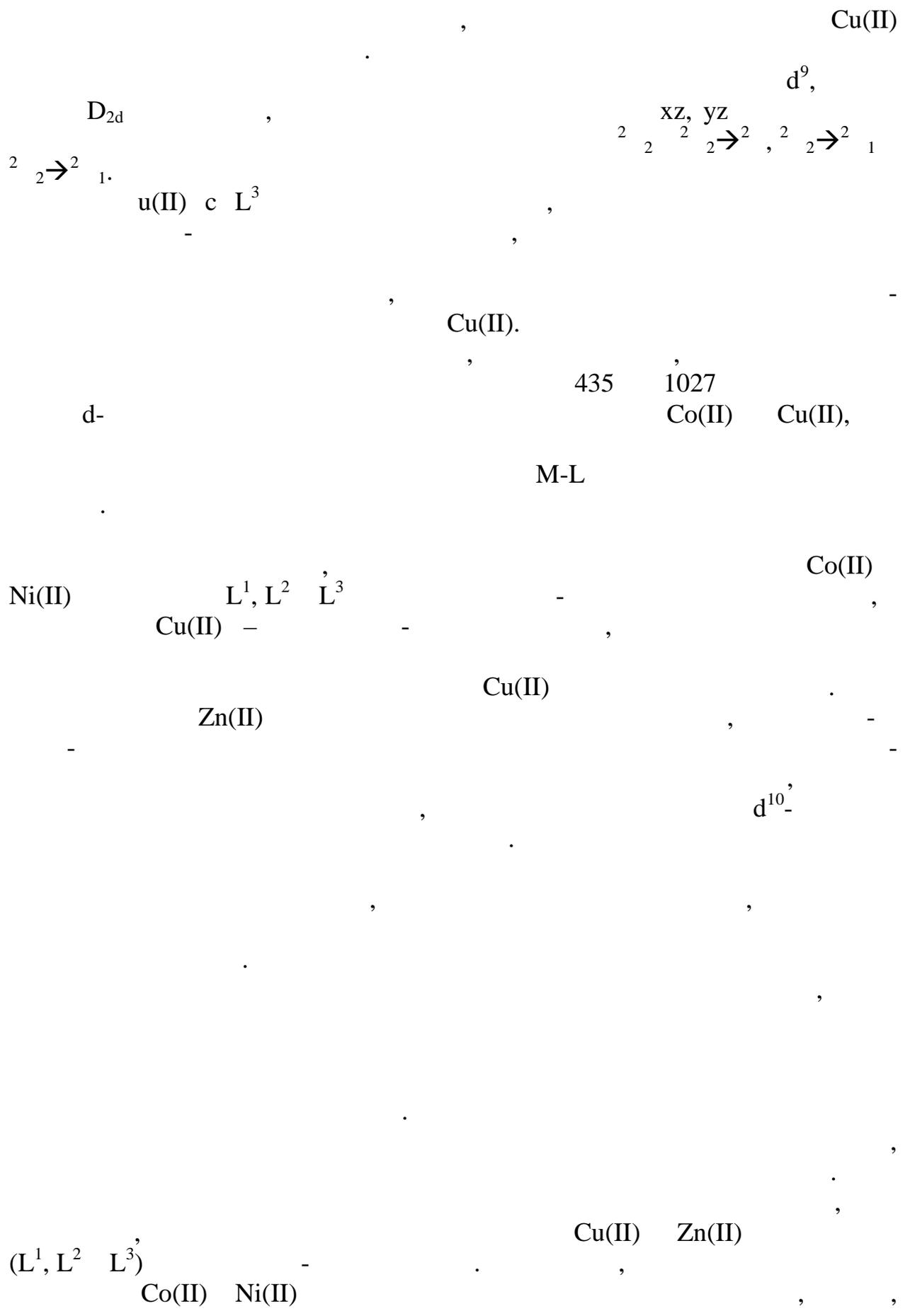
(cm^{-1})

		ν_1	ν_2	ν_3	Dq	B
CoL^1_2	Oh(-)	13673	16233	21650	1456	435
NiL^1_2	Oh(-)	13694	15358	19246	1466	445
CuL^1Cl	Td(-)	13850	17260	27480	1531	1025
NiL^2_2	Oh(-)	13440	14706	20000	1466	445
CuL^2_2Cl	Td(-)	13890	17290	27580	1531	1017
$C \text{ L}^2_2$	Oh(-)	14598	17762	28089	1621	684
CoL^3_2	Oh(-)	13670	17544	22760	1453	676
NiL^3_2	Oh(-)	13469	15385	19231	1446	445
CuL^3Cl	Td(-)	13900	17280	27570	1541	1027

$Cu(II) \text{ c } L^3 (.3)$

$13900, 17280, 27570 \text{ cm}^{-1}$
 $^2 2 \rightarrow ^2 1$ $^2 2 \rightarrow ^2 1$

$^2 \rightarrow ^2 2$

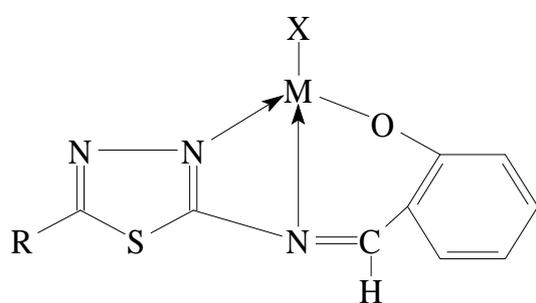


Co(II), Ni(II), Cu(II) Zn(II) L¹, L² L³.

38,2-49,8 -1. 2. -1.

L¹, L² L³

L¹⁻³



M:L,

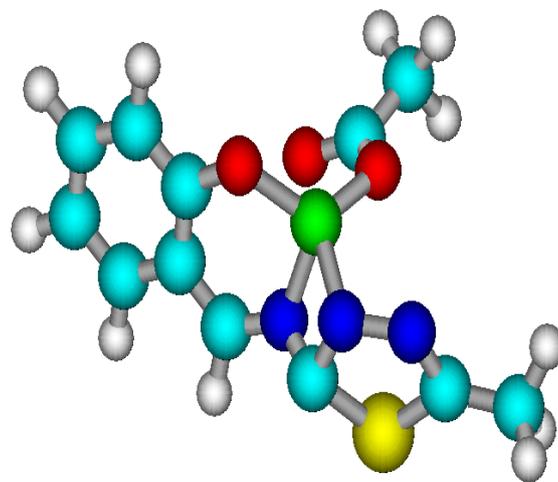
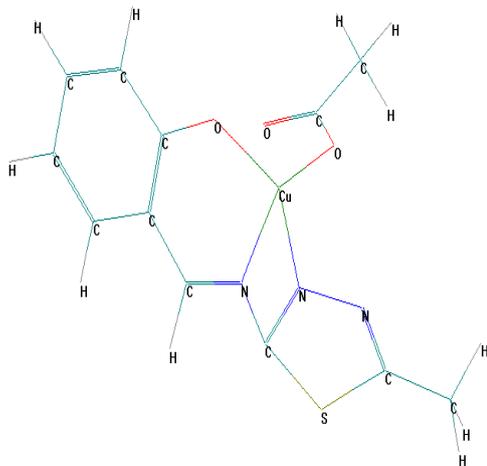
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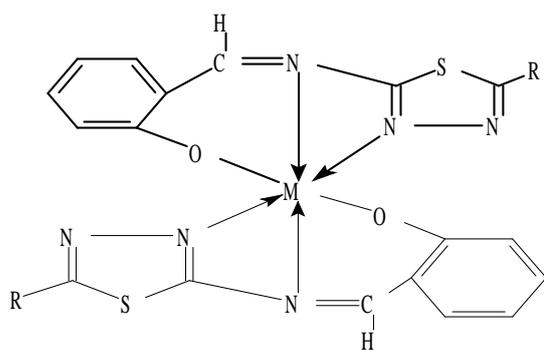
Cu(II) Zn(II)

1:1

= Cu(II), Ni(II)
 X – Cl⁻, CH₃COO⁻, NO₃⁻;
 R – H, CH₃, C₂H₅.



HyperChem



– Co(II), Ni(II);
R – H, -CH₃, -C₂H₅

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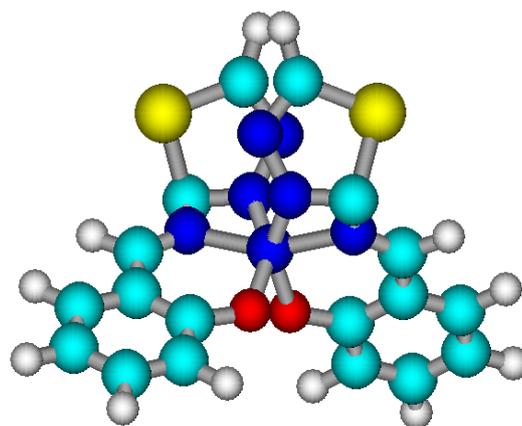
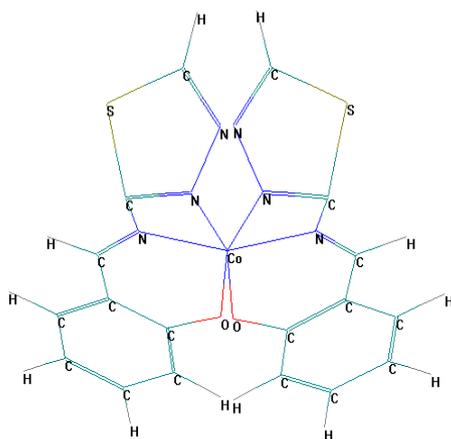
()

Co(II) Ni(II)

1:2

M:L.

6,



HyperChem

Co(II), Ni(II) Cu(II)
1,3,4-

1,3,4-

(2'-)-1,3,4-)-1,3,4- , 5- -2-(2'-)-1,3,4-
 Co(II), Ni(II) Cu(II)

()

4.

(. 4),

Co(II) Ni(II) 1:2,

Cu(II) 1:1.

M:L

(. 4)

o(II) > Ni(II) > Cu(II).

(II)

$Cl^- > NO_3^- > CH_3COO^-$.

L^{1-3}

L^2

L^1

L^3

			λ	lg	
L¹					
CoCl ₂ +L ¹	1:2		500	3,53	3,47
Co(NO ₃) ₂ +L ¹	1:2		510	3,45	3,40
Co(CH ₃ COO) ₂ +L ¹	1:2		520	2,79	2,71
NiCl ₂ +L ¹	1:2		430	3,89	3,81
Ni(NO ₃) ₂ +L ¹	1:2		400	3,77	3,70
Ni(CH ₃ COO) ₂ +L ¹	1:2		410	3,07	3,00
CuCl ₂ +L ¹	1:1		420	4,67	4,61
Cu(NO ₃) ₂ +L ¹	1:1		425	4,09	4,02
Cu(CH ₃ COO) ₂ +L ¹	1:1		440	4,07	4,00
L²					
CoCl ₂ +L ²	1:2		540	4,33	4,27
Co(NO ₃) ₂ +L ²	1:2		550	4,13	4,06
Co(CH ₃ COO) ₂ +L ²	1:2		530	3,14	3,09
NiCl ₂ +L ²	1:2		450	5,20	4,97
Ni(NO ₃) ₂ +L ²	1:2		420	4,94	4,88
Ni(CH ₃ COO) ₂ +L ²	1:2		430	3,44	3,39
CuCl ₂ +L ²	1:1		420	6,36	6,30
Cu(NO ₃) ₂ +L ²	1:1		400	5,95	5,89
Cu(CH ₃ COO) ₂ +L ²	1:1		410	5,76	5,71
L³					
Cl ₂ +L ³	1:2		530	3,86	3,80
(NO ₃) ₂ +L ³	1:2		540	3,81	3,76
Co(CH ₃ COO) ₂ +L ³			550	3,79	3,71
NiCl ₂ +L ³	1:2		430	4,75	4,69
Ni(NO ₃) ₂ +L ³	1:2		410	4,60	4,55
Ni(CH ₃ COO) ₂ +L ³	1:2		420	4,55	4,49
CuCl ₂ +L ³	1:1		400	4,84	4,79
Cu(NO ₃) ₂ +L ³	1:1		430	4,82	4,76
Cu(CH ₃ COO) ₂ +L ³	1:1		440	4,77	4,70

Co(II), Ni(II) Cu(II)

1,3,4-

L^1, L^2, L^3 2,0
 1,0 L^1, L^2, L^3
 L^1, L^2, L^3 Ni(II) Co(II) L^1, L^2, L^3 1:2, Cu(II)
 1:1
 Co(II), Ni(II) Cu(II)

$CuC_{10}H_8N_3SOCl$, $CuC_{11}H_{10}N_3SOCl$, $CuC_9H_6N_4SO_4$, $CuC_{10}H_8N_4SO_4$,
 $CuC_{11}H_{10}N_4SO_4$, $CuC_{11}H_9N_3SO_3$, $CuC_{12}H_{11}N_3SO_3$, $CuC_{13}H_{13}N_3SO_3$ 1:1
 M:L. $CoC_{18}H_{12}N_6S_2O_2$, $CoC_{20}H_{16}N_3SO$, $CoC_{22}H_{20}N_6S_2O_2$
 $NiC_{18}H_{12}N_6S_2O_2$, $NiC_{20}H_{16}N_3SO$, $NiC_{22}H_{20}N_6S_2O_2$, $C_{18}H_{12}N_6S_2O_2$,
 $CoC_{10}H_8N_3SOCl$, $CoC_{20}H_{18}N_6S_2O_2Cl_2$, $CoC_{18}H_{12}N_6S_2O_2$, $CoC_{10}H_8N_4SO_4$,
 $CoC_{20}H_{18}N_7S_2O_5$, $CoC_{18}H_{12}N_6S_2O_2$, $CoC_{12}H_{11}N_3SO_3$, $CoC_{22}H_{21}N_6S_2O_4$,
 $NiC_{18}H_{12}N_6S_2O_2$, $NiC_{10}H_8N_3SOCl$, $NiC_{20}H_{18}N_6S_2O_2Cl_2$, $NiC_{18}H_{12}N_6S_2O_2$,
 $NiC_{10}H_8N_4SO_4$, $NiC_{20}H_{18}N_7S_2O_5$, $NiC_{18}H_{12}N_6S_2O_2$, $NiC_{12}H_{11}N_3SO_3$,
 $NiC_{22}H_{21}N_6S_2O_4$ 1:2 M:L.

(LD₅₀)

(II) (L¹) 2-(2'- -)-1,3,4-
 $CuC_9H_6N_4SO_4$;

1.

2.

MNDO PM-3

3. Zn(II) Co(II), Ni(II), Cu(II)

4. Co(II) Ni(II) Cu(II) Zn(II)

5. Co(II), Ni(II) Cu(II)

6. $CuC_9H_6N_4SO_4$ (II)

1. 2-(2-)-1,3,4-

, 2006.- . 48-49.

2. Ni(II) Zn(II)

3. Zn(II) 5- -2-(2'-)-1,3,4-
, 2007. 25-26 .-C.51-56.
4. Co(II), Ni(II), Cu(II) Zn(II)
, 2007. 30 .- .7-10.
- 20 5. , 2008,
.- .230-231.
6. d-
, 2009. - 1. - .3-8.
2009. 7. d- c 2-(2'-)-1,3,4-
3. - .4-7. .//
2009. 8. 3d-
3. - .62-65.
9. , 2009. 6-7 .-
.184-185.
10. Cu(II)
, 2010. 4. - .88-90.
11. d- 5- -2-(2'-)-1,3,4-
, 2010. 6-9 .- .11-12.
12. Co(II), Ni(II) Cu(II) 5- -2-(2'-)-1,3,4-
.//

.185-186. : III - . . . - , 2010. 21-23 . -

13. . . , . . , . . .
3d-
. // ,
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. - .177-178.
14. . . , . . , . . .
3d- 2-(2 -
-)-1,3,4- . //
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.131.
15. . . , . . , . . .
3d- 2-(2 -
)-1,3,4- . // .
- . . , 2011. 12-14 . - .239.

16. . . , . . , . . .
Co(II) Cu(II) 5- -2-(2'-
-)-1,3,4- . //
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. . . , 2012. 19- . - .59.

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3d–

(Co, Ni, Cu, Zn)

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- Co, Ni, Cu Zn.

: Co, Ni, Cu Zn

36



3d-

(Co, Ni, Cu, Zn)

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Co, Ni, Cu Zn

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RESUME

thesis of Aliyeva Mukaddas Tuychievna on the of scientific degree competition of the doctor of philosophy in inorganic chemistry, specialty 02.00.01-Inorganic chemistry, subject “**Coordination compounds of 3d-metalls (Co(II), Ni(II), Cu(II), Zn(II)) with the new Shiff basis**”

Key words: coordinated compounds, transitional metals, azomethinthiadiazole derivatives, quantum-chemical calculations, antivirus activity.

Subject of inquiry: polyfunctional alkyl-substituted azomethinthiadiazoles, transition metals - Co, Ni, Cu and Zn.

Aim of inquiry: synthesis, study, establishment the complex formation laws of single and mixed ligand coordination compounds of transitional metals with the polyfunctional alkyl-substituted azomethinthiadiazoles and determination of biological activity a number of synthesized complex compounds in liquids.

Method of inquiry: elemental, thermal analysis, electronic, IR-and PMR-spectroscopy, quantum-chemical calculations.

The results achieved and their novelty: 36 new complexes of chlorides, nitrates, acetates of Co, Ni, Cu, Zn on the base of azomethinthiadiazole derivatives were synthesized. Composition, structure, physic l-chemical properties were determined and new complexes possessing antivirus activity were obtained.

Practical value: developed conditions and methods of the alkyl-substituted azomethinthiadiazoles derivatives and its metal complexes on their base can be base for creation of practical recommendations on aimed synthesis of related coordinated compounds and also for forecast of the heterocyclic ligands and transitional metal complexes properties and structure. The determinate antivirus activity of the synthesized new cuprum complexes has indicated on the possibility of their application at creation of preparations for virus treatments of agro culture.

Degree of application and economical efficiency: obtained experimental data were realized in education processes on department of inorganic and analytical chemistry of NUU.

Sphere of usage: coordination chemistry, analytical chemistry, organic chemistry, medicine.

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