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SYNTHESIS OF METALLOCOMPLEXES WITH MIXED LIGAND OF Ni (II) WITH NAPHTHALENE-1,5-DISULPHO ACID

Abstract

In this paper has been studied of the synthesis complex compound tetraaqua-(ethane-1,2-diamine)-nickel naphthalene-1,5-disulfonate hydrate $(C_2H_{16}N_2NiO_4)^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ The structural of this substances and properties of the synthesized complex were analyzed by IR spectroscopy, X-ray structural analysis (RSA) was proposed by the results of thermal analysis methods Deposit paper number 2212513 was also obtained from the SSDS database.

Key words: nickel (II) sulfate, naphthalene-1,5-disulfo acid, distilled water, ethylenediamine.

СИНТЕЗ МЕТАЛЛОКОМПЛЕКСОВ ДВУХВАЛЕНТНОГО НИКЕЛЯ СО СМЕШАННЫМИ ЛИГАНДАМИ (НАФТАЛИН-1,5-ДИСУЛЬФОКИСЛОТА)

Аннотация

В данной статье синтезировано тетра аква (1,2-диаминоэтан) никель (II) гидрат нафталин-1,5-дисульфоната $(C_2H_{16}N_2NiO_4)^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ комплексное соединение. Предложены структурные формулы и свойства синтезированного комплекса на основании по результатам ИК спектроскопии, рентгеноструктурного анализа (РСА), термического анализа. Депозитарные статьи № 2212513 также получены из базы данных SSDS.

Ключевые слова: Сульфат никеля (II), нафталин-1,5-дисульфокислота, дистиллированная вода, этилендиамин.

Ni (II) NING NAFTALIN-1,5-DISULFOKISLOTA BILAN ARALASH LIGANDLI METALLOKOMPLEKSLARI SINTEZI

Annotatsiya

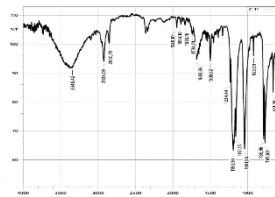
Ushbu maqolada tetra akka (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat $(C_2H_{16}N_2NiO_4)^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ tarkibli kompleks birikma sintez qilindi. Sintez qilingan kompleksning tuzilish formulasi va xossalari IQ spektroskopiya, rentgen strukturaviy analiz (RSA), termik analiz usullari natijalariga asoslanib taklif qilindi. CCDC bazasidan 2212513 raqamli depozit qog'ozi ham olindi.

Kalit so'zlar: nikel (II) sulfat, naftalin-1,5-disulfokislota, distillangan suv, etilendiamin.

Kirish: Oziq-ovqat havfsizligi dasturi, bugungi kundagi rivojlangan va rivojlanayotgan mamlakatning strategik yo'nalishi ekanligi butun dunyoga ma'lum. Shu munosabat bilan ekin maydonlarini kengaytirish va hosildorlikni oshirish evaziga aholini oziqlantirish masalasi birinchi o'rinda turibdi. Shu munosabat bilan qishloq xo'jaligi ishlab chiqarishining asosiy vazifasi uni kimyoviy lashtirish hisobiga ekinlar hosildorligini oshirishdan iborat [1]. Hozirgi vaqtda jahonda va mamlakatimizda ishlab chiqarish korxonalarida, qishloq xo'jaligi ekinlarini rivojlantirishda hamda tibbiyot sohasida, tarkibida naftalin halqasi saqlagan yoki naftalin hosilalari asosida sintez qilinayotgan metallokomplekslarning ahamiyati birmuncha muhim hisoblanadi [2-3]. Jumladan tarkibida naftalin halqasi saqlagan metallokomplekslarning turli xil konsentratsiyali eritmalaridan o'simlik hujayralarining bo'linishi va kengayishida [4], o'simliklarda qo'shimcha ildizlar hosil qilishda [5], o'simlik mevalari hosilini oshirishda [6], mevalarning erta to'kilish ketishining oldini olishda [7], o'simliklarda urug'chili va changchili gullarining nisbatlarini o'zgartirishda va boshqa ko'pgina sohalarida qo'llanilmoqda [8]. Bundan tashqari ushbu modda, turli xil maxsulotlarni ishlab chiqarish uchun, texnologik sikllarda, komponent yoki oraliq mahsulotlar sifatida, turli xil maxsulotlar ishlab chiqarishda ham qo'llanilmoqda [9-10]. Tibbiyotda ham dorilar ishlab chiqarishda bunday tipdagi komplekslarning turli xil konsentratsiyali eritmalaridan foydalanilmoqda [11]. Bo'yoqlar ishlab chiqarishda [12], diazolin preparati sintez qilishda, laboratoriyalarda ilmiy-tadqiqot ishlarini olib borishda ham qo'llash mumkin [13].

Tajribaviy qism. Analitik tarozida nikel (II) sulfat kristallgidrat tuzidan $(NiSO_4 \cdot 7H_2O)$ 0,01 mol (2,81 gr) hamda naftalin-1,5-disulfokislolaning natriyli tuzidan $(C_{10}H_6Na_2O_6S_2)$ 0,01 mol (3,32 gr) tortib olindi. Olingan moddalarni distillangan suv yordamida eritib, eritma hosil qilindi. Hosil bo'lgan eritmalar orasidan dastlab naftalin-1,5-disulfokislota eritmasidan 5 ml o'lchab olindi, tubi yassi kolbaga quyildi. So'ngra kolbadagi eritma ustiga, nikel (II) sulfat tuzi eritmasidan ham 5 ml quyildi. Hosil bo'lgan aralashmani, magnitli aralashtirgich yordamida aralashtirilib turilgan holatda, etilendiamin $(NH_2-CH_2-CH_2-NH_2)$ eritmasidan 1 ml tomchilatib quyildi va 50-55°C oralig'ida 25-30 minut davomida qizdirildi. Hosil bo'lgan tiniq och pushti rangli eritmani shisha flakonlarga quyildi, bug'latish uchun xona haroratida qoldirildi va jarayon kuzatib turildi. Natijada oradan 10-15

kun vaqt o'tgach idishlar tubida to'q ko'k rangli, donador shakldagi, yaxlit kristallar hosil bo'lgani kuzatildi. Hosil bo'lgan kristallarni rentgen strukturaviy analiz (RSA) yordamida analiz qilinganda, tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$. tarkibli yangi kristallar ekanligi aniqlandi. Reaksiya tenglamasi quyidagicha taklif qilindi.



1-rasm. Naftalin-1,5-disulfokislota ($C_{10}H_6Na_2O_6S_2$) IQ spektri.

1-rasmda naftalin-1,5-disulfokislota natriyli tuzining IQ spektridan ko'rinib turibdiki, $\nu(Ar)=C-H$ bog'ining valent tebranishi $3348,42 \text{ sm}^{-1}$ past intensiv sohada, CH_2 bog'ining tebranishi $2924,09 \text{ sm}^{-1}$ assimetrik valent va yuqori intensiv sohada, CH bog'ining deformatsion tebranishi orbitoni $1836,16 \text{ sm}^{-1}$ past intensiv sohada, $-C=C-$ bog'ining valent tebranishi $1683,86 \text{ sm}^{-1}$ past intensiv sohada, $(Ar(C_6H_6))$ bog'ining halqa tebranishi $1500,62 \text{ sm}^{-1}$ o'rtacha intensiv soha oralig'ida, SO_2 bog'ining assimetrik valent tebranishi, $1234,44 \text{ sm}^{-1}$ sohada, naftalin halqasining halqa tekisligidan boshqa tekislikda tebranishlari $786,96 \text{ sm}^{-1}$ sohada, $Me-O$ bog'ining tebranishlari $661,58 \text{ sm}^{-1}$ sohada uchraydi.



2-rasm. Sintez qilingan tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$. tarkibli kompleks birikma IQ spektri.

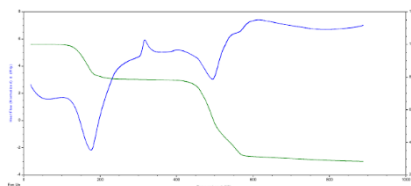
Ushbu yuqoridagi 2-rasmda tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$. ning IQ spektri tahlillaridan ko'rinib turibdiki $N-H$ bog'ining valent tebranishlari $3427,51 \text{ sm}^{-1}$ sohada, $\nu(Ar)=C-H$ bog'ining valent tebranishi $3286,70 \text{ sm}^{-1}$ past intensiv sohada, CH_2 bog'ining assimetrik deformatsion tebranishi $1458,13 \text{ sm}^{-1}$ soha oralig'ida, $O-H$ bog'ining valent, keng va intensiv yutilish sohasi $3344,57 \text{ sm}^{-1}$ soha oralig'ida, $-C=C-$ bog'ining valent tebranishi $1653,00 \text{ sm}^{-1}$ past intensiv sohada, $(Ar(C_6H_6))$ bog'ining halqa tebranishi $1500,62 \text{ sm}^{-1}$ o'rtacha intensiv soha oralig'ida, SO_2 bog'ining assimetrik, valent tebranishi $1240,23 \text{ sm}^{-1}$ sohada, naftalin halqasining, halqa tekisligidan, boshqa tekislikda tebranishlari $792,74 \text{ sm}^{-1}$ sohada, $Me-O$ bog'ining tebranishlari, $661,58 \text{ sm}^{-1}$ soha oralig'ida kuzatildi.

1-jadval.

Naftalin-1,5-disulfokislota ($C_{10}H_6Na_2O_6S_2$) hamda sintez qilingan tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ larning IQ spektri tahlillari.

Tebranish tavsifi	N-H	N(Ar) =C-H	CH ₂	=CH	-C=C-	-C=N-	N (Ar(C ₆ H ₆))	SO ₂	Nafta linn halqa	Me-O
$C_{10}H_6Na_2O_6S_2$	-	3348,42	2924,09	1838,16	1683,86	-	1500,62	1234,44	786,96	661,58
$(C_{10}H_6N_2NiO_4)^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$	3427,51	3286,70	1458,13	-	1653,00	1585,49	1500,62	1240,23	792,74	661,58

Yuqorida 1-jadvalda keltirilgan ma'lumotlardan ko'rinib turibdiki, naftalin-1,5-disulfokislota $N-H$ bog'ining tebranishlari yo'qligi va hosil bo'lgan tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidratda $3427,51 \text{ sm}^{-1}$ sohada $N-H$ bog'ining valent tebranganligi, $=CH$, $-C=N-$, bog'larida ham o'zgarishlar mavjudligi, qolaversa sintez qilingan kompleksning barcha bog'larida ham tebranish chastotalarining ma'lum miqdorda siljiganligi, yangi kompleks hosil bo'lganligidan dalolat beradi.



3-rasmda tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$. tarkibli kompleks birikmaning termik analizi keltirilgan.

Tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_{10}H_6N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ tarkibli kompleksning termik analizi natijasiga ko'ra 2 bosqichda TG hamda bir necha bosqichda DTA parchalanishi kuzatildi. Birinchi termik parchalanish jarayon boshlangandan so'ng 185°C gacha davom etdi, bunda kompleks tarkibidagi suv molekularining bug'lanishi hisobiga ma'lum miqdorda massa yo'qotish bilan yakunlandi. Ikkinchi termik parchalanish $185,5^\circ\text{C}$ dan boshlanib kompleks tarkibidagi bog'larning asta-sekin uzilishi va mahsulotning termik parchalanishi hisobiga $578,04^\circ\text{C}$ gacha jarayon davom etdi. Shuningdek, yuqoridagi 3-rasmdagi ma'lumotlardan ham ko'rinib turibdiki, differensial termik analiz (DTA) natijasida bir nechta ekzotermik parchalanish jarayoni sodir bo'lganligi va mahsulot to'liq parchalanib ketganligi aks etgan.

Xulosa. Olib borilgan tadqiqotlar natijasida naftalin-1,5-disulfokislotaning nikel (II) tuzi va etilendiamin bilan o'zaro tasiri natijasida, tetra akva (1,2 diamino etan) nikel (II) naftalin-1,5-disulfonat gidrat ($C_2H_{16}N_2NiO_4$) $^{2+} \cdot (C_{10}H_6O_6S_2)^{2-} \cdot 2(H_2O)$ tarkibli yangi metallokompleksi sintez qilindi. Sintez qilingan metallokompleksning tarkibi, molekulyar va kristall tuzilishlari RSA, IK, termik analiz tahlili usullari yordamida aniqlandi.

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