

**O'ZBEKISTON SO'G'LIQNI SAQLASH
VAZIRLIGI TOSHKENT FARMATSEFTIKA
INSTITUTI FARMASIYA FAKULTETI
ANORGANIK KIMYO FANIDAN**

REFERAT

**Mavzu : I B guruhcha elementlari va
xossalari**

Topshirdi: 1-kurs 2/1-guruh G'ofurjonov I.

Qabul qildi : R.Sh. Zaripova

TOSHKENT - 2016

I B guruh elementlari

I B guruh elementlari, ularning birikmalari va xossalari

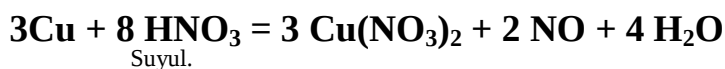
Mis, kumush, oltin I B guruh elementlariga kiradi. Ularning tashqi qavatida bittadan elektron bor. Tashqaridan ikkinchi qavatda to'lgan d elektron qavat bor. Bu elementlar ionlanish energiyasining qiymati IA guruh elementlaridan keskin farq qilib, anchagina yuqoriligi ko'rinib turibdi. Bu elementlarning eng asosiy kattaliklari jadvalda keltirilgan.

I B guruh elementlarining eng asosiy kattaliklari.

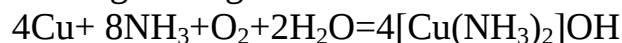
Asosiy kattaliklar	Mis	Kumush	Oltin
Suyuql. harorati, °S	1083	960,5	1455
Zichligi, g/sm ³	8,96	10,5	19,3
Atom massa	63,62	107,87	196,97
Elektron formulasi	3d ¹⁰ 4s ¹	4d ¹⁰ 5s ¹	5d ¹⁰ 6s ¹
Atom radiusi, nm	0,128	0,144	0,144
Ionlanish energiyasi M → Me ⁺	7,726	7,576	9,226
Yer po'stlog'ida tarqalishi, mol qism	3,6·10 ⁻³	1,6·10 ⁻⁶	5·10 ⁻⁸

Bu elementlar qiyin oksidlanuvchi elementlar hisoblanadi. Bu metallar vodorod ionlari va kislorod bilan oksidlanmaydi. Ular shuning uchun yarim nodir yoki nodir metallar qatoriga kiradi.

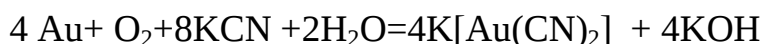
Mis va kumush kontsentrlangan nitrat va sulfat kislota bilan 160° dan yuqori oksidlanadi.



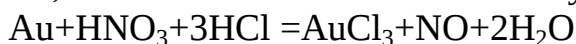
Mis ammiakning suvdagi eritmasida ham kislorod ishtirokida eriydi:



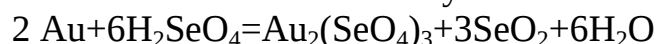
Mis, kumush va oltin ishqorlar ta'siriga chidamli, lekin sianidlarda yaxshi eriydi:



Oltin nitrat, sulfat kislotalar bilan oksidlanmaydi. Unga zar suvi ta'sir etadi:



Yana oltin selenat kislotasida ham eriydi:



Mis

Tabiatda uchrashi. Tabiatda oz miqdorda tug'ma mis uchraydi. Birikma holdagi Cu_2O kuprit, Cu_2S mis yaltirog'i, CuFeS_2 misli kolchedani yoki xalkopirit, CuO -tenerit minerali, shuningdek malaxit $(\text{CuOH})_2\text{CO}_3$ ma'lum. Kumush sulfidlar holatida qo'rgoshin, rux, kadmiy bilan birga uchraydi. Mis, kumush va oltin tabiatda erkin metallar holatida ham uchraydi.

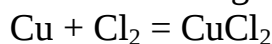
Mis elementi tabiatda ikki xil izotop holday uchraydi: $^{63}_{29}\text{Cu}$ (69,1%) va $^{65}_{29}\text{Cu}$ (30,9%). $^{64}_{29}\text{Cu}$ radioaktiv izotopining yarim emirilish davri 12,8 soat.

Fizik xossalari: pushti qizil rangli, yumshoq, yuqori issiqlik va elektr o'tkazuvchanlikka ega. Suyuql. harorati 1083°S .

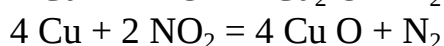
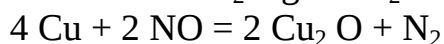
Kimyoviy xossalari: Mis havoning miqdoriga qarab Cu_2O va CuO kabi oksidlar hosil qiladi. Cu_2O – qizil rangli. Beqaror birikma:



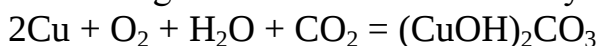
Mis galogenlar bilan ham odatdagi sharoitda oksidlanadi:



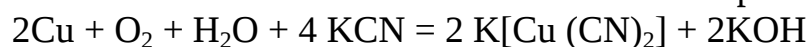
Yuqori haroratda NO misni Cu_2O ga NO_2 bo'lsa CuO ga oksidlaydi.



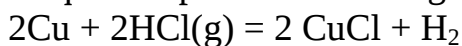
Azot va uglerod mis bilan ta'sir etmaydi.



Sianit ionlari ishtirokida mis oson oksidlanib sianidli komplekslar hosil qiladi.



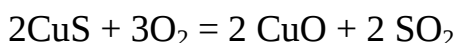
Yuqori temperaturada mis gaz holdagi HCl bilan ta'sirlanadi.



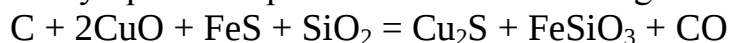
Odatdagi sharoitda reaksiya chapga surilgan yuqori haroratda o'ngga suriladi.

Mis va uning birikmalari **kuchli zahar** hisoblanadi.

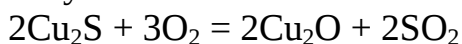
Olinish usullari: Dastlab rudalarni yoqib oksidlar olinadi:



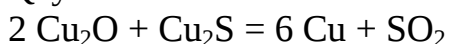
Rudalarni suyuqlantirish pechlarda olib borilib unga koks qo'shiladi:



Kuydirish:



Qaytarish:

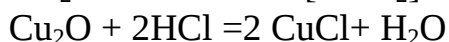
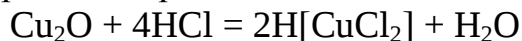


Shunday usulda olingan misning tozaligi 95-98% ga etadi. Toza mis olish uchun mis sulfati misli anod elektrodi ishtirokida elektroliz qilinadi.

Texnikada ishlatilishi. Mis asosida ko'pdan ko'p asbob va uskunar tayyorlanadi. Tunuka xoldagi mis bilan kemalar o'raladi. Misdan ko'p qotishmalar tayyorlanadi. Masalan, bronza – mis 90%, qalay – 10% ; latun – mis 60 % ,rux-40%; melxior- mis - 68%, Ni-30%, Mn-1%, temir-1%; pul tayyorlaydigan chaqalar- Cu 95%, alyuminiy-5%.

Misning birikmalari

Cu⁺¹ bo'lgan birikmalari. Mis (1) oksidi **Cu₂O** – qizil kristall modda. Amfoter oksid, lekin natriy gidroksidda qiyin eriydi. Galogenovodorodlarda ham qiyin eriydi. Suyultirilgan eritmalar rangsiz eritmalar hosil bo'ladi. Agar kislota tarkibida suv ko'p bo'lsa oq cho'kma hosil bo'ladi.



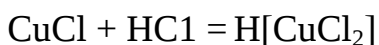
Mis (1) oksidi ammiakda ham oson eriydi. Bunda ammiakli komplekslar hosil bo'ladi:



Mis (1) gidroksid(sariq rangli) beqaror, u parchalanib qizil rangli mis(I) oksid hosil qiladi:



Galogenlar bilan CuCl, CuF hosil qiladi. Bu birikma yuqori konsentratsiyali kislotalarda eriydi.

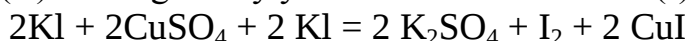


Mis(I) uchun $[\text{Cu}(\text{NH}_3)_2]^+$ turdagi ammiakatlar xos. Shu tufayli ko'p mis(I) birikmalari ammiak eritmasida yaxshi eriydi.

Cu(II) xlorid qizdirilgan Cu metali bilan ta'sir etganda CuCl hosil bo'lishi kuzatilgan:



Agar mis(II) sulfatiga kaliy yodid ta'sir ettirilsa mis (I) yodid olinadi:



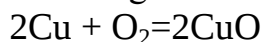
CuI – oq cho'kma Cu₂S ni mis olishda ishlatiladi. Cu(I)ning kompleks birikmalari anchagina barqaror. Ularning beqarorlik doimiyligi jadvalda keltirilgan.

Mis(I)ning ba'zi komplekslarining beqarorlik doimiyligi.

Kompleks birikma	$[\text{CuCl}_2]^-$	$[\text{CuBr}_2]^-$	$[\text{CuI}_2]^-$
K _{beqarorlik}	$2,9 \cdot 10^{-6}$	$1,2 \cdot 10^{-6}$	$1,4 \cdot 10^{-9}$
Kompleks birikma	$[\text{Cu}(\text{CN})_2]^-$	$[\text{Ag}(\text{CN})_2]^-$	$[\text{Au}(\text{CN})_2]^-$
K _{beqarorlik}	$1 \cdot 10^{-16}$	$8 \cdot 10^{-22}$	$5 \cdot 10^{-39}$

Cu⁺² birikmalari. Mis (II) oksid, **qora rangli** amorf modda. Gazlarni adsorbsiya qila oladi.

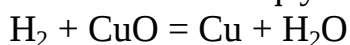
Mis (II) oksidi misning kislorod bilan ta'siridan olinadi.



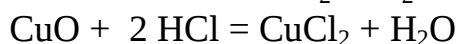
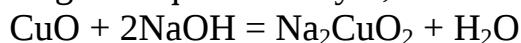
Yuqori haroratda u parchalanib mis(I) oksidini hosil qiladi:



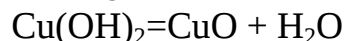
Mis(II) oksidni vodorod bilan qaytarilsa misga aylanadi:



CuO konsentrlangan ishqorlarda eriydi, lekin kislotalarda oson eriydi:



Mis (II) oksidini quyidagi usullarda ham olish mumkin:

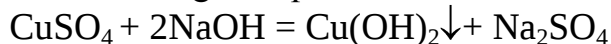


Mis(II) gidroksid ammiak eritmasida oson erib ammiakatlar hosil qiladi:

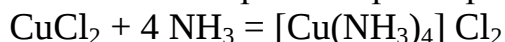


Bu reaksiyada ko'k rangli tetraaminmis(II) gidroksid olish mumkin.

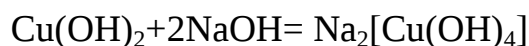
Mis (II) gidroksidi mis sulfatga ishqorlar ta'sir ettirib olinadi.



Misning (II) birikmalari ko'pdan ko'p kompleks birikmalar hosil qiladi:



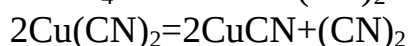
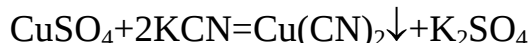
Agar yangi olingan Cu(OH)_2 ga konsentrlangan ishqorlar qo'shilsa ko'k rangli gidroksikupratlar hosil bo'ladi:



Hosil bo'lgan gidroksikupratlar oson parchalanadi va beqarordir. Mis(II) galogenidlari kislotalar eritmalarida galogen kupratlar hosil qiladi:



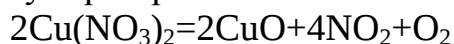
Mis(II)ning sianidlari va rodanidlari beqaror, lekin sianidli komplekslar ancha barqaror hisoblanadi:



Kaliy tetrasianokuprat ancha barqaror kompleks hisoblanadi.

Mis(II)sulfat CuSO_4 suvsiz holatda oq kukun. Suvdagi eritmalar ko'kish-havo rangli. Bunday rang eritmadagi $[\text{Cu(H}_2\text{O)}_4]^{2+}$ borligini ko'rsatadi. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ mis kuporosi deyiladi.

Mis(II)nitrati- $\text{Cu(NO}_3)_2 \cdot 3\text{H}_2\text{O}$ misning nitrat kislota bilan ta'siridan olinadi. Qizdirilsa, suvini yo'qitib parchalanadi va azot(IV) oksid va kislorod hosil qiladi:



Mis(II) asetati - $\text{Cu(CH}_3\text{COO)}_2 \cdot \text{H}_2\text{O}$ - mis yoki uni oksidini sirka kislotalada erishidan hosil bo'ladi.

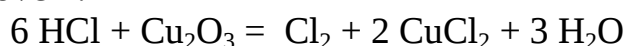
Mis(II) xlorid to'q ko'k rangli kristallar hosil qiladi. Syultirilgan eritmalar yashil rangga, konsentrlangan eritmaları tim ko'k rangga ega.

Misning oksidlanish darajasi +3 bo'lgan birikmalari. Tarkibida fluor tutgan birikmalar olingan: $\text{K}_3[\text{CuF}_6]$.

Mis(II) gidroksidini ishqoriy muhitda oksidlab NaCuO_2 olish mumkin:



Undan mis (III) oksidi - Cu_2O_3 olingan. Uning birikmalari beqaror. Bu birikma kuchli oksilovchi:



Reaksiya natijasida xlor va misning(II) tuzlari hosil bo'ladi.

Kumush va uning birikmalari

Tabiatda uchrashi. Tabiatda kumush juda kam tug'ma holda uchraydi. Ko'p birikmalar mishyak yoki surma bilan birga uchraydi. Masalan: kumush

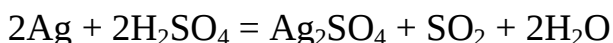
tiosurmanit Ag_3SbS_3 . Ag_3AsS_3 - kumush tioarsenit. Kumush yaltirog'i Ag_2S va AgCl , AgBr , AgI lar ham tabiatda uchraydi.

Kumush tabiatda ikki xil izotop $^{107}_{47}\text{Ag}$ (51,35%) va $^{109}_{47}\text{Ag}$ (48,65%) holatida tarqalgan. Uning radioaktiv izotopi $^{110}_{47}\text{Ag}$ bo'lib yarim yemirilish davri 253 kun.

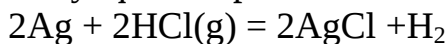
Fizik xossalari. Kumush oq yaltiroq metal. Yuqori qovushqoqlikka ega. Undan ingichka sim tayyorlasa bo'ladi. Yuqori issiq va elektr o'tkazuvchanlikka ega. Bu guruh ichida kumushning elektr o'tkazuvchanligi eng yuqori. Simob bilan amalgamalar hosil qiladi.



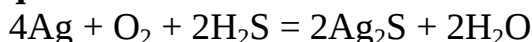
Kimyoviy xossalari. Kumush kislorod, vodorod va kislotalar bilan oksidlanmaydi. Ozon bilan oksidlanadi. Nitrat va konsentrlangan sulfat kislota bilan yuqori haroratda oksidlanadi.



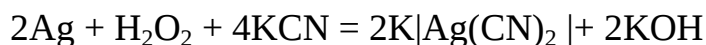
Gaz holatidagi HCl bilan yuqori temperaturada reaksiyaga kirishadi.



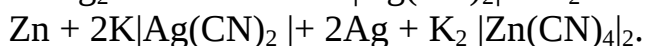
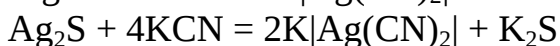
Kumush galogenlar bilan qiyin oksidlanadi. **Nam havoda** kumush vodorod sulfid ishtirokida havo kislorodi bilan oson oksidlanadi. Kumushdan yasalgan taqinchoqlarni **qorayib qolishini sababi** ana shundadir.



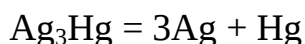
Kaliy tsianid ishtirokida kislorod va vodorod peroksidi ham kumushni oson oksidlaydi.



Kumushning olinish usullari: 1. Sianid usuli:



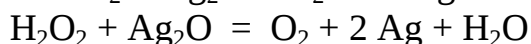
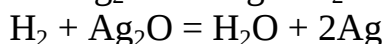
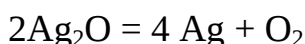
2. Amalgamalarni parchalab olinadi:



Kumush idishlar, asboblari, taqinchoqlar, jarrohlik uskunalari tayyorlashda ishlatiladi. Taqinchoqlar tayyorlashda tamg'a (proba) qo'yiladi. Kumush tamg'asi 800-875 orasida bo'ladi. Bu 1000 tarkibiy qismdan 800-875 qism kumush, qolganlari qo'shimchalar ekanligini ko'rsatadi. Ko'p miqdorda kumush birikmalari fotografiya maqsadlari uchun sarflanadi.

Ag^{+1} birikmalari. Kumushning oksidlanish darajasi +1 bo'lgan birikmalari ko'p uchraydi. Lekin +2 va +3 birikmalari ham bor. Kumush II va III valentligi birikmalari juda beqaror, faqat kompleks birikmalar holida mavjud.

Ag_2O qora qo'ng'ir rangli kristall modda

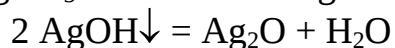
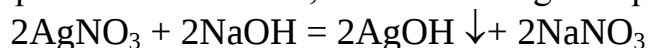


Bu reaksiyalarda kumush oksidi oksidlovchi. Kumush(I) oksidi ammiakda yaxshi eriydi:

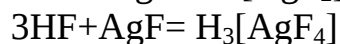
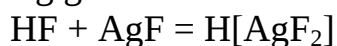


Bu reaksiyalarda kompleks asoslar hosil bo'ladi.

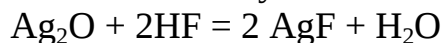
AgOH beqaror birikma bo'lib, kumush nitratga ishqorlar ta'sir qilib olinadi:



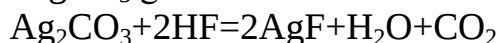
Kumushning galidlari kumush ftoriddan boshqasi yomon eriydi:



Kumush oksidi HF da eriydi va eruvchan tuz AgF ni hosil qiladi:

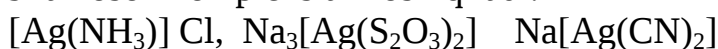


AgF ni AgCO_3 ga HF ta'sir etib ham olish mumkin:

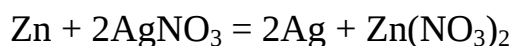


$\text{AgF} \cdot 2\text{H}_2\text{O}$ yoki $\text{AgF} \cdot 4\text{H}_2\text{O}$ rangsiz kristallar hosil qilishi kuzatilgan.

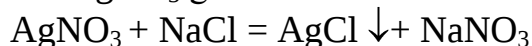
AgCl ammiak bilan oson komplekslar hosil qiladi.



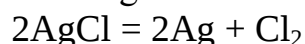
Ag^+ ioni kuchsiz kislotali muhitda kuchli oksidlovchi.



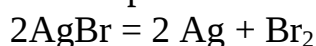
Kumush xloridi AgNO_3 ga xlorid kislota tuzlari ta'siridan olinadi:



Kumush xlorid fotog'ozlarda ishlatiladi.



Kumush bromid fotoplenkada ishlatiladi

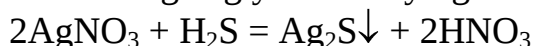


Kumush galidlari fiksaj ta'sirida eriydigan galogenidlar hosil qilib plenka va qog'ozdan nur ta'sirida o'zgarishga uchramagan galidlar qavatini yo'qotadi:

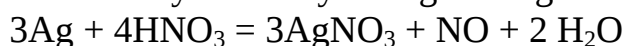


AgJ birikmasi kompleks hosil qilmaydi.

Ag_2S kumushning eng yomon eriydigan tuzi. U quyidagicha olinadi:



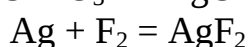
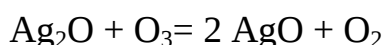
Kumush nitrat suvda yaxshi eriydi va gidrolizga uchramaydi.



Kumush birikmalari fotoqg'oz, fotoplenkalar tayyorlashda, tibbiytda dezinfeksiya qiluvchi modda sifatida ishlatiladi. Ag^+ ionlari tibbiyotda bakteriyalar o'sishini to'xtatish uchun qo'llaniladi.

Bir og'irlik hissa AgNO_3 bilan ikki og'irlik hissa KNO_3 eritmasi lyapis deb ataladi va tibbiyotda ishlatiladi.

Ag^{+2} birikmalari. Kumushning oksidlanish darajasi +2 bo'lgan bir necha birikmasi bor. Bularga AgO va AgF_2 misol bo'ladi. AgO kumush (I) oksididan ozon ta'sirida olinadi.



Ag^{+3} birikmalari. Oksidlanish darajasi +3 bo'lgan faqat birgina birikma ma'lum, u ham bo'lsa sariq rangli $\text{K}[\text{AgF}_4]$ olingan.

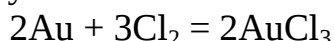
Oltin va uning birikmalari

Tabiatda uchrashi. Nodir metall tabiatda tug'ma holda uchraydi. Tellur bilan birikmasi bor. AuAgTe_4 - **silvanit** deyiladi. **Klaverit** tarkibi Au_2Te dan iborat.

Fizik xossalari: sariq rangli yaltiroq metall. Oltin pastikligi eng yuqori bo'lgan metall. Undan qalinligi 0,0002 mm bo'lgan zarqog'oz tayyorlash, yoki 1 g oltindan uzunligi 3 km bo'lgan ip tayyorlash mumkin.

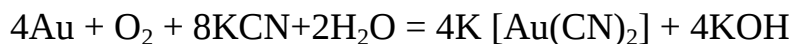
Tabiatda oltinning izotopi faqat $^{197}_{79}\text{Au}$ (100%) holatida uchraydi. Oltinning radiaktiv izotopi $^{198}_{79}\text{Au}$ uning yarim emirilish davri 2,7 kun. Bu izotop radioaktiv indikator sifatida ishlatiladi.

Kimyoviy xossalari. Oltin suv, kislotalar, kislorod, nitrat kislota, sulfat kislota ta'sirida oksidlanmaydi. Oltin galogenlar bilan odatdagi sharoitda juda oz ta'sirlashadi, lekin fluor bilan $300-400^\circ\text{S}$ ta'sirlashadi. Xlorning suvdagi eritmasi uni oson oksidlaydi:

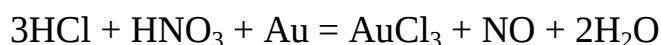


Bu reaksiya xlor ioni ishtirokida tezlashadi. Bunda suvda eruvchan $\text{H}[\text{AuCl}_4]$ kompleksi hosil bo'ladi.

Oltin sianid ionlari ishtirokida tez oksidlanadi:

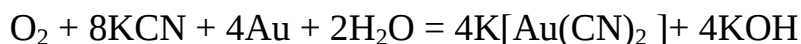


Oltin zar suvida eriydi.

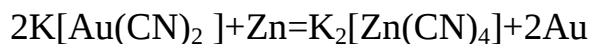


Olinishi. Oltin rudalarni yuvish orqali olinadi. Yoki uning simob bilan amalgamasini parchalash orqali olinishi mumkin.

Hozirgi kunda oltin olishning sianidli usul bor. Bu usulga ko'ra ruda kaliy sianid yoki natriy sianid bilan yuviladi.



Eritmadan oltin boshqa biror metal (Zn, Fe) bilan ajratib olinadi:

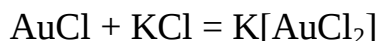
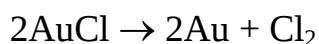


Ishlatilishi. Dunyoda ishlab chiqaziladigan oltinning ko'p miqdori davlat omborlarida valyuta zahirasi sifatida saqlanadi. Oltin asosan taqinchoqlar tayyorlash uchun ketadi. 1000 qism qotishmaga nisbatan oltinning massasi ko'rsatiladi. Bu yerda tamg'a bor. 750, 583, 500 va 375 tamg'a qo'yiladi. ko'rsatilgani oltin qolgani qo'shimchalar. Shu paytgacha topilgan tug'ma oltinning eng katta miqdori 112 kg bo'lib, Janubiy Afrika respublikasida kavlab olingan.

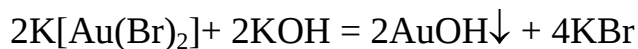
1800 yilda dunyo bo'yicha 18 t, 1900 yilda 400 t, 1970 yilda 1500 t oltin (sobiq SSSR hisobga olinmagan) ishlab chiqazilgan.

Au^{+1} birikmalari. Oltinning hamma birikmalari termik beqaror. Au_2O , Au_2S erimaydigan birikmalar Au^{+3} birikmalari ancha barqaror. Oltinning xlor bilan reaksiyasi $150-300^\circ\text{S}$ oralig'ida ketadi. Pastroq haroratda (150°S) AuCl_3 , yuqori haroratda (300°S) AuCl hosil bo'lishi kuzatilgan.

AuCl och sariq rangli kukun modda oson parchalanadi:



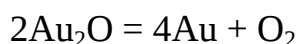
Kaliy dibromoauratga kuchli ishqorlar ta'sir etilganda oltin(I) gidroksidi hosil bo'ladi:



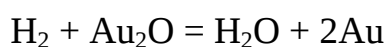
AuOH beqaror birikma, u oson parchalanadi:



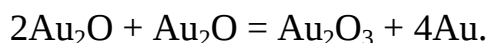
Au₂O qizdirilsa parchalanadi:



Unga vodorod ta'sir ettirilsa oltin hosil bo'ladi:

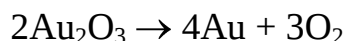


Au₂O disproporsialanish reaksiyasiga uchraydi:

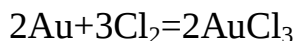


AuBr, AuJ, Au₂S - **qora modda**. AuCN – **jigar** rang modda.

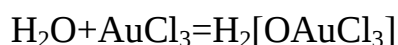
Au+3 birikmalari. Oltinning (III) valentli birikmalaridan Au₂O₃ –qora qo'ng'ir kristall modda bo'lib qizdirilganda oltin va kislorodga parchalanadi:



Oltin birikmalaridan eng ko'p ishlatiladigani AuCl₃ ni olish uchun kukun holatdagi oltinga 200°S haroratda mo'l xlor ta'sir ettiriladi:



Hosil bo'lgan modda qizil rangli. AuCl₃ ni suv bilan ta'siridan kompleks anion hosil bo'lishi ma'lum:



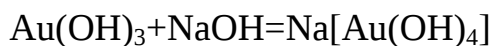
Bu erda qizil jigar rangli akva kislotalar hosil bo'ladi. Oltin kislotasi (**H[AuCl₄]**) oltinni xlor bilan to'yintirilgan xlorid kislotada erishidan hosil bo'lgan birikmasi hisoblanadi:



Bu birikma eritma bug'latilganda **H[AuCl₄]*4H₂O** holiday ajralib chiqadi. Shu kislota tuzlaridan sariq rangli natriy tetraxloroaurat “oltin tuz” nomi bilan mashur. Bu tuz ham kristallogidrat holatida uchraydi- **Na[AuCl₄]*2H₂O**.

AuBr₃-qora qo'ng'ir rangli modda, **Au₂S₃**-qora rangli modda hisoblanadi.

Au(OH)₃ –qizil-jigar rangli kristall birikma. Uning kislotali xossalari kuchliroq amfoter gidroksid. Au(OH)₃ ishqorlarda erib gidroksiauratlar hosil qiladi:



Ishqoriy metallar tuzlari ishtirokida $\text{Na}[\text{Au}(\text{NO}_3)_4]$, $\text{Na}[\text{Au}(\text{SO}_4)_2]$, $\text{Na}[\text{Au}(\text{CN})_4]$, $\text{Na}[\text{AuS}_2]$ kabi qator kompleks birikmalar olingan.

I B guruh elementlarining tibbiyotdagi o'rni. Fermentlar, garmonlar, vitaminlar bilan bog'langan bo'lgani uchun mis hayotiy muhim jarayonlarga anchagina ta'sir etadi: bu jarayonlar **ko'payish, qonning quyulishi, pigmentatsiya, organizmning o'sishi va rivojlanishi, oksidlash-qaytarilishi jarayonlari va almashinishdir**. Mis yetishmaganda gemogloblin hosil bo'lishi kamayib, anemiya kuzatiladi. Mis tutgan fermentlar metallofermentlarning asosiy qismini tashkil etadi.

Tibbiyot amaliyotida $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ishlashitilishi ma'lum. Bu modda **antiseptik xossaga** ega. Kumushning **kollargol (70% gacha kumush bor)** va **protargol (8,3% gacha kumush)** degan dorivor turlari ma'lum. Kumush nitrat juda zaharli bo'lib tashqaridan eroziya, yara, traxoma va boshqa teri kasalliklarida buyuriladi.

Odam organizmida kumushga eng boy miya hisoblanadi. Bir sutkada odam organizmiga 0,1 mg atrofida kumush kiradi. Kumush ko'proq tuxum sarig'ida ko'pligi aniqlangan (100g da 0,2 mg kumush).

Oltin birikmalari organizmni chidamliligini oshirishi ma'lum. In vitro tajribalarida oltin birikmalarining sil kasalligi chaqiruvchilariga faolligi ma'lum bo'lgan. Oltinning kompleks birikmasi AuNaS_2O_3 volchanka kasalligida ishlatiladi. Oltinning **krizolgan, triftal** degan organik birikmalari ham shu maqsadda ishlatiladi. Krizanol $[\text{Au-S-CH}_2\text{-CH}_2\text{-OH-CH}_2\text{SO}_3]_2\text{Ca}$ volchanka, sil va moxov kasalligida samarali dori vositasi sifatida ishlatilishi ma'lum. Shuningdek krizanol revmatoidli artritda antibiotiklar va kortikosteroidlardan ancha samarali ekanligi aniqlangan.

Foydalanilgan adabiyotlar ro'xati

1. H.R. To'xtayev, R.Aristanbekov, K.A. Cho'lponov, S.N. Aminov. Anorganik kimyo ("Farmasiya" -5720500- bakalavriyat ta'lim yo'nalishi uchun darslik/ O'zR Oliy va o'rta maxsus ta'lim vazirligi.- T."Nohsir",2011.520 b.
2. H.R. To'xtayev, « Anorganik kimyo » ma'ruzalar matni, 2015, 219 b.
3. Umumiy va anorganik kimyodan amaliy mashg'ulotlar: farmatsevtika instituti talabalari uchun o'quv qo'llanmasi (Mualliflar S.N.Aminov, R.Aristanbekov, H.R. To'xtayev va boshq.; S.N.Aminov tahriri ostida). T.,2016.-512 b.