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## TABIY GAZNI OLTINGUGURTLI BIRIKMALAR VA KARBONAT ANGIDRIT GAZIDAN TOZALASH

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### ANNOTATSIYA

*Ma'lumki, har bir davlatning rivojlanishida tabiiy va mineral-resurs boyliklarining mavjudligi muhim rol o'ynaydi. Dunyo miqiyosida sanoatning kengayishi va aholi sonining ortib borishi natijasida issiqlik va elektr energiyaga bo'lgan talablarning ortib borishi ko'rsatgichlari, respublikamizdagi tabiiy boyliklar, xususan neft, gaz va ko'mir zaxiralari hamda dunyo miqiyosidagi ushbu zaxiralarning ko'rsatgichlari qiyosiy tahlil qilingan.*

***Kalit so'zlar:** katalizator, vodorod sulfid, oltingugurt, komponent, absorbsiya, konvertor.*

## PURIFICATION OF NATURAL GAS FROM SULFUR COMPOUNDS AND CARBONIC ANHYDRIDE GAS

### ABSTRACT

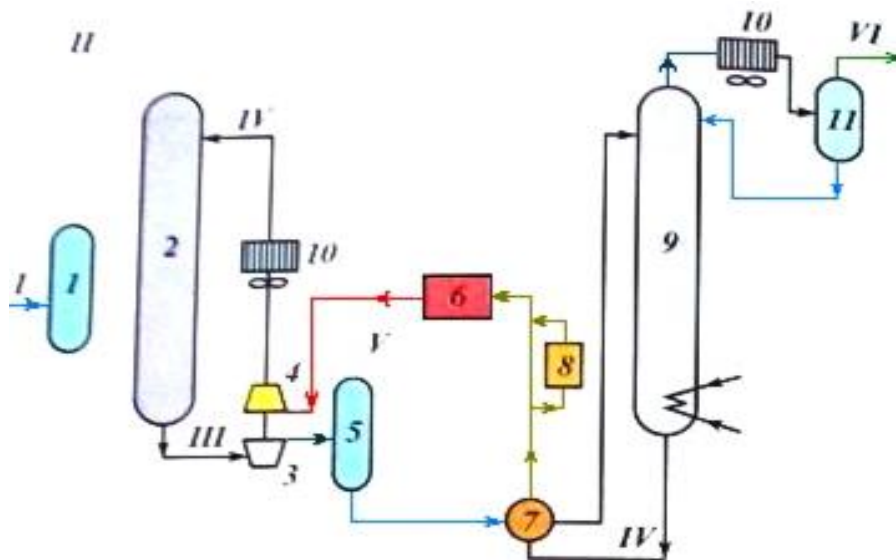
*It is known that the availability of natural and mineral resources plays an important role in the development of every country. Indicators of increasing demand for heat and electricity as a result of the expansion of industry and population growth at the world level, natural resources in our republic, in particular oil, gas and coal reserves, and indicators of these reserves at the world level have been comparatively analyzed.*

***Key words:** catalyst, hydrogen sulfide, sulfur, component, absorption, converter.*

Ko'pgina tabiiy gaz konlarida gazning tarkibida oltingugurt birikmalari va karbonat angidrit gazi bo'lib, ular nordon gazlar deb ataladi. Oltingugurt birikmasi gazni qayta ishlash jarayonida katalizatorlarni buzadi, yonganda CO<sub>2</sub> va CO<sub>3</sub> oksidlari paydo bo'ladi, atmosfera havosiga chiqarilganda insoniyat va atrof muhit uchun

xavflidir. Vodorod sulfid va karbonat angidrit  $\text{CO}_2$  gaz suv mavjud bo'lgan muhitda po'lat quvurlarda, quvur uzatmaning jihozlarida, kompressor mashinalarida korroziyani hosil qiladi. Ular mavjud bo'lganda gidratlanish tezlashadi. Oltinugurt komponentlari mavjud bo'lganda iste'molga beriladigan gazning tarkibiga yuqori talablar qoyiladi. Hozirgi vaqtda vodorod sulfid ning  $\text{H}_2\text{S}$  tabiiy gazda ruxsat etilgan miqdori  $5,7 \text{ mg/m}^3$ , umumiy oltinugurt  $50 \text{ mg/m}^3$  dan yuqori emas, karbonat angidrit  $\text{CO}_2$  gazining miqdori esa 2 % dan ko'p emas. Tabiiy gazning oltinugurtli komponentlari birinchi navbatda  $\text{H}_2\text{S}$  oltinugurt ishlab chiqarish uchun asosiy xom ashyo hisoblanadi.

Gazni oltinugurtdan tozalik darajasi 99,9 %ni tashkil qiladi. Hozirgi qo'llaniladigan "Sho'rtanneftgaz" MChJ va Muborak gazni qayta ishlash zavodlaridagi yangi texnologiyalar asosida oltinugurtni ishlab chiqarish va atmosfera bosimini tozaligini ta'minlashdan iborat.



**1-rasm. Kimyoviy absorbsiya usulida tabiiy gazni tozalash qurilmasining sxemasi:**

1-ajratgichga kirish; 2-absorber; 3-gidravlik turbina; 4-nasos; 5-shamollatgich; 6-oraliqqa o'rnatilgan sig'im; 7-issiqlik almashtirgich; 8-filtr; 9-desorber; 10-havo sovutgichi; 11-refleksli ajratgich; I-xom gaz; II-tozalangan gaz; III-tuyintirilgan absorbent; IV-regenerasiyalangan absorbent; V-shamollatilgan gaz; VI-nordon gaz.

Katta hajmdagi gazlarni tozalashning an'anaviy usullariga quyidagi jarayonlar kiradi:

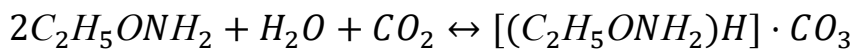
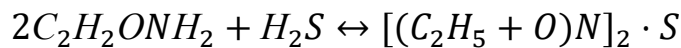
nordon komponentlarni qazib olish, tozalangan gazni ishlab chiqarish;

oltinugurtdagi nordon gazlarni qayta ishlash;

chiqib ketuvchi gazlarni tozalash yoki yoqish; yongan gazlarni tozalash.

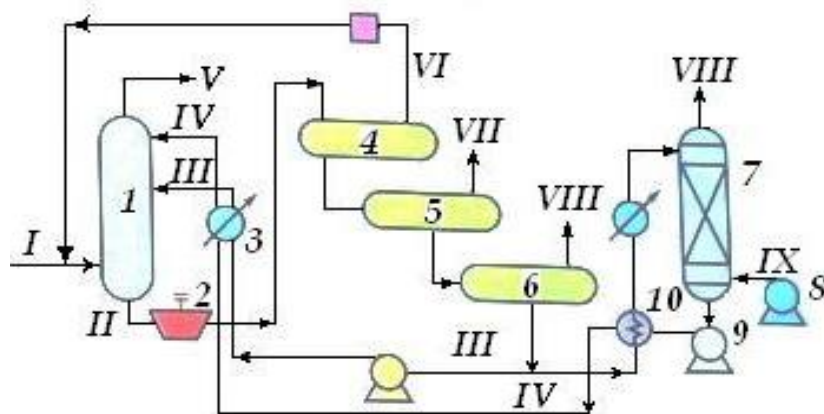
Gazdan nordon komponentlar kimyoviy yoki fizik absorbsiya jarayonida olinadi. Undan keyin esa oltingugurt ishlab chiqarish qurilmasiga yo'naltirilgan toyintirilgan absorbent regenerasiya qilinadi va nordon gazning oqimi olinadi. Kimyoviy absorbsiya jarayonlarida yutuvchilarni suvli aralashmasi qo'llaniladi. Kimyoviy yutuvchilar sifatida monoetanolamin, dietanolamin, diglikol'amin, ishqorli metallar.

Monoetanolamin jarayoni ko'p qo'llaniladi va yutuvchilar bilan yuqori darajada reaksiyaga kirishuvchanligi bilan tavsiflanadi. U yuqori darajada kimyoviy chidamli va kapital sarf xarajatlari kam. Monoetanolaminning oltingugurt va nordon karbon gazlari o'zaro ta'sir etish reaksiyasini quyidagi ko'rinishdagi tenglamalar orqali ifodalash mumkin:



Jihozlarni korroziyalanishini keltirib chiqarmaslik uchun monoetanolaminning eritmadagi suvli aralashmasi 15-20 % dan oshmaydi.

Tabiiy gazni oqimidagi nordon gazlar fizik absorbent bilan tasniflanadi va yutuvchilarni sirkulyasiyada neftni tezlik bilan yutilishi, kam energiya xarajatlari, gabarit o'lchamlarining katta emasligi va jihozlarning soddaligidir. Eritgichlarning tarkibiga kirib keladigan gazning tarkibi, haroratga va bosimga asoslanadi, unga keyinchalik navbatdagi ishlov berish va tozalangan gazning talablari ham hisobga olinadi (2-rasm).

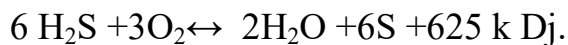
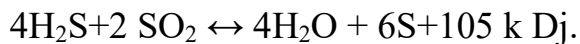
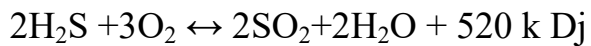


**2-rasm. Fizik absorbsiya usulida gazni quritish qurilmasining sxemasi:**

1-absorben; 2-detander; 3-sovutgich; 4,5 va 6-birinchi, ikkinchi va uchinchi pog'ona shamollatgichlari; 7-bug'lantirish kolonnasi; 8-havo purkagich; 9-nasos; 10-issiqlik almashgich; I-kirib keluvchi gaz; II-toyintirilgan absorbent; III-dag'al generatsiyalangan absorbent; IV-mayda generatsiyalangan absorbent; V-tozalangan gaz; VI-resiklangan gaz, VII-o'rtacha bosimda shamollatilgan gaz; VIII- nordon gaz; IX-havo yoki inert gaz.

Tabiiy gazni tozalashni ikkinchi jarayonida – oltingugurtli birikmalardan oltingugurt ajratib olinadi. Katta hajmdagi tabiiy gazning oqimiga ishlov berilganda Klaus jarayonining har xil modifikasiyalaridan foydalaniladi. U havodagi kislorodni regeneratsiya kolonnasining absorbsiya jarayonida kirib keluvchi vodorod sulfid bilan katalizatorlik reaksiyasiga asoslangan.

Klaus reaksiyasi ikki bosqichda bo‘lib o‘tadi.



Oltingugurtni chiqishini ko‘paytirish uchun mos bo‘lgan jarayon ikki bosqichli reaksiyada olib boriladi. Birinchi boshlanishida Klaus pechida yuqori haroratda vodorod sulfid ning bir qismi yoqiladi va oltingugurt oksidi olinadi.

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January 2024

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A handwritten signature in black ink, appearing to read "M. Kurbonov".

SIGNATURE

M. KURBONOV



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# DIPLOMA

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