

«SAPONIT MINERALINING FIZIK– KIMYOVIY ASOSLARI VA UNING AHAMIYATI»

*Tursunova Firuza Jamshidovna*

*Abu Ali ibn Sino nomidagi Buxoro davlat tibbiyot instituti*

*“Biokimyo” kafedrasi assistenti*

*sevinchsultan1315@gmail.com*

**ANNOTATSIYA:**

Ushbu maqolada saponit minerali nisbatan katta kristalli panjara bilan trioktaedral magniy smektitlari guruhiga kirishi Navoyi viloyatidagi Vaush konining saponiti bentonitlarning keng oilasining bir turi bo'lishi, tarkibida MgO magniy miqdori yuqori bo'lgan montmorillonit guruhiga kirishi, unda  $Al^{3+}$  alyuminiy deyarli butunlay  $Mg^{2+}$  magniy bilan almashtirilishi va  $Si^{4+}$  kremniy qisman  $Al^{3+}$  bilan almashtirilishi haqida yoritilgan. Shu bilan birga, kimyoviy, rentgen-fazali, IQ-spektrometrik, rentgen-lyuminesstent va mikroskopik usullar bilan turli xil kimyoviy, mineralogik va fizik-kimyoviy xususiyatlar o'rganilgani, saponit minerallarini o'rganish bo'yicha olib borilgan tadqiqotlar ularning kon-metallurgiya, kimyo, qishloq xo'jaligi va xalq xo'jaligining boshqa tarmoqlarida foydalanish uchun maqbulligini ko'rsatilgan.

**Kalit so'zlar:** saponit, kimyoviy tarkibi, mineralogik tarkibi, fizik-kimyoviy xususiyatlari, Xspektrometrik tahlil, rentgen-fazali tahlil, rentgen-lyuminesstent tahlil, kon-metallurgiya, kimyo, qishloq xo'jaligi va xalq xo'jaligining boshqa tarmoqlaridagi ahamiyati keltirilgan .

**АННОТАЦИЯ:**

In this article, the mineral saponite belongs to the group of trioctahedral magnesian smectites with a relatively coarse crystal lattice. Vaush mine saponite in the Navoi region is a variety of a wide family of bentonites, belongs to the group of montmorillonite with a high magnesium content of MgO, in which aluminum  $Al^{3+}$  is almost completely replaced by magnesium  $Mg^{2+}$ , and silicon  $Si^{4+}$  is partially replaced by  $Al^{3+}$ . At the same time, various chemical, mineralogical and physicochemical properties were studied by chemical, X-ray phase, IR spectrometric, X-ray fluorescence and microscopic methods, studies were carried out to study saponite minerals and their extraction and metallurgy. , indicated that it is acceptable for use in chemistry, agriculture and other sectors of the economy.

**Ключевые слова:** сапонит, химический состав, минералогический состав, физико-химические свойства, рентгеноспектральный анализ, рентгенофазовый анализ, рентгенофлуоресцентный анализ, значение в горной металлургии, химии, сельском хозяйстве и других отраслях народного хозяйства.

**ABSTRACT:**

In this article, the saponite mineral belongs to the group of trioctahedral magnesium smectites with a relatively large crystal lattice. The saponite from the Vaush mine in Navoi region is a type of a wide family of bentonites.  $Si^{4+}$  silicon is partially replaced by  $Al^{3+}$ . At the same time, various chemical, mineralogical and physico-chemical properties were studied by chemical, X-ray phase, IR-spectrometric, X-ray fluorescence and microscopic methods, the research conducted on the study of saponite minerals and their mining and metallurgy, it is indicated that it is acceptable for use in chemistry, agriculture and other sectors of the national economy.

**Key words:** saponite, chemical composition, mineralogical composition, physicochemical properties, X-spectrometric analysis, X-ray phase analysis, X-ray fluorescence analysis, importance in mining and metallurgy, chemistry, agriculture and other branches of the national economy.

Saponit gil - bu noyob tabiiy shakllanishlar bo'lib, ularning sanoat konlari jahon amaliyotida birinchi marta Ukrainada, Xmelnitskiy viloyatining Shimoliy qismida topilgan[1-2]. Ular berestovets Vendu shakllanishining asosiy tarkibi bo'lgan tuflarning loyga o'xshash rang-barang ob-havo qobig'i bilan ifodalanadi. Varvarovskoye saponit gil koni Ukrainada yagona hisoblanadi. Shuningdek, u dunyodagi saponitning sanoat rivojlanishi uchun eng katta, eng o'rganilgan, o'rganilgan va istiqbolli hisoblanadi[3 va 25]. Saponit tabiiy sorbent bo'lib, yuqori adsorbsion, ion almashinuvi, katalitik va filtrlash xususiyatlariga ega. Saponit jinsi quyuc qizil, ba'zan to'q qizil, hidsiz va ta'msiz loyga o'xshash mineraldir[4va 26]. Saponit tarkibidagi MgO (10% ichida) turli xil organik birikmalar hosil bo'lishi kabi yuzlab biologik reaksiyalarda muhim rol o'ynaydi[23]. Yurak mushaklari va qon tomir tizimi, Markaziy va periferik asab tizimlari, ovqat hazm qilish organlari va boshqalarda ishtirok etadi[5]. Montmorillonit - saponit guruhi minerallarining kristalli tuzilishi to'yinmagan shakllarning ikki qatlamidan iborat:ikkita tetraedral  $SiO_2$  panjara va ular orasida joylashgan va asosan 2:1 turdagi Al, Mg, Fe ni o'z ichiga olgan bitta oktaedral panjara[6]. Ushbu uch qatlamli kristall panjara o'rtasida izomorfik almashinuv sodir bo'lishi mumkin. Shuning uchun montmorillonit guruhining minerallari yuqori adsorbsion va ion almashinadigan xususiyatlarga ega[7]. Montmorillonit guruhining minerallari 50-100 mg/eq kation almashish qobiliyatiga ega. Saponitning kation almashinuvi hajmi trepel va glaukonitga qaraganda ancha katta va 0,68 mg/ekv/g ni tashkil qiladi. Ma'lumki, kation almashinuvining juda katta hajmi va katta ionlardagi yuqori selektiv faollik tufayli qatlamli silikatlar ammoniy va kaliy ionlaridan, radioaktiv suvlardan, shuningdek sanoat korxonalarining chiqindi suvlarini og'ir metall ionlaridan tozalash uchun istiqbolli tabiiy sorbentlardir[8]. Saponit katta gidroksidi metall ionlari va ammoniyga selektiv sorbent sifatida yuqori selektivlikni ko'rsatadi[22]. Ion almashinuvchisi sifatida faollashtirilgan saponit suvdan qo'rg'oshin,

stronsiy, kadmiy, ammoniy, radioaktiv seziv va boshqalarni samarali ravishda ajratib olishi mumkin[9].

usulda tarkibi aniqlandi (jad. ) va mineralning tarkibi tuzilishi aniqlash uchun rentgenorammasi olindi (rasm). Ushbu ko'rsatkichlar saponit mineraliga xosligini ko'rsatadi.

Jadval

Saponit minerali mass-spektroskopik usulda kimyoviy tarkibi

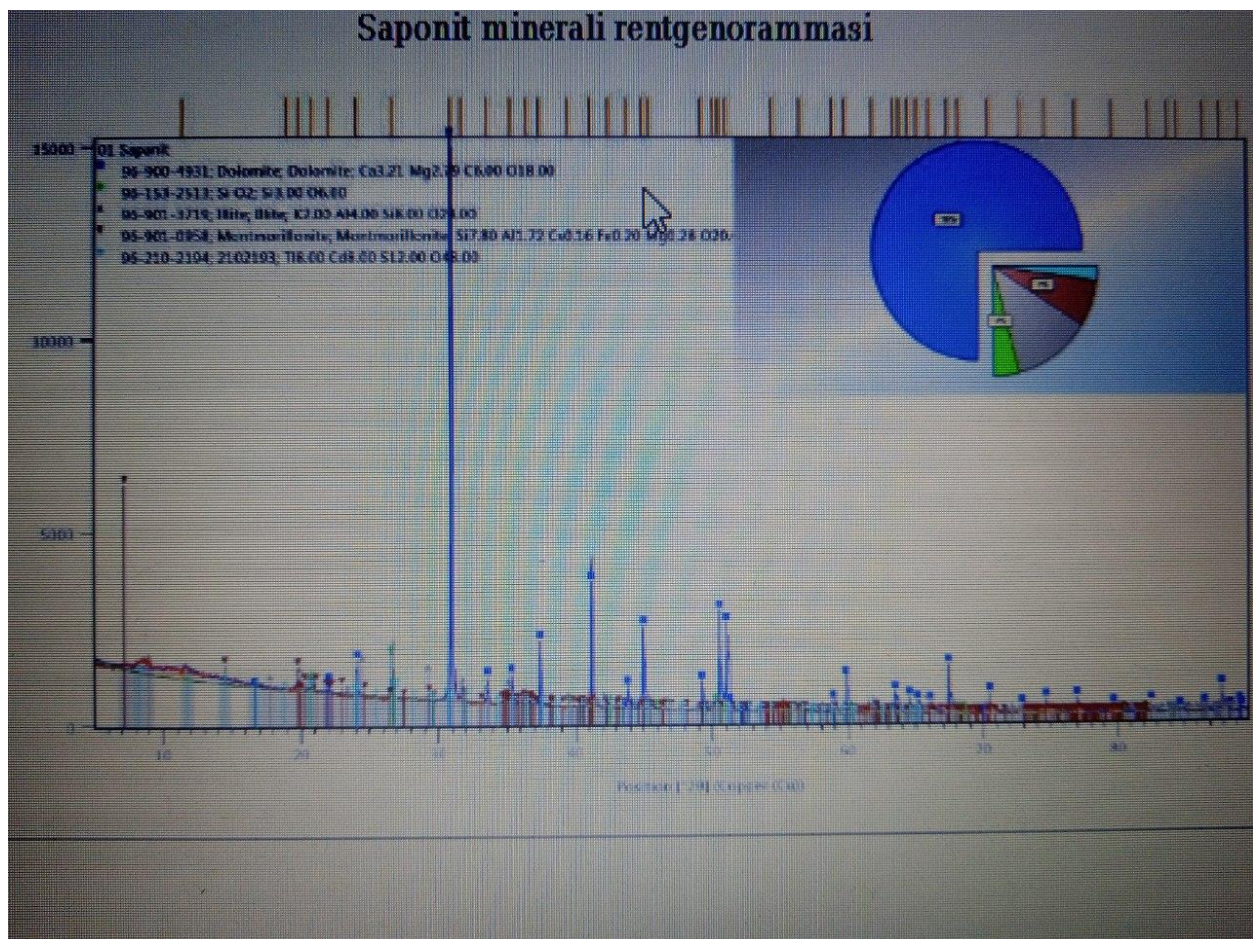
Li	Be	B	Na *	Mg *	Al *	P	K *	Ca *	Sc	Ti *	V	Cr	Mn	Fe *	Ce
26,0	0,870	24,0	15000	100000	29000	480	10000	150000	4,10	810	54,0	44,0	250	11000	1,70
Ni	Cu	Zn	Ga	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sn
9,10	20,0	27,0	3,90	18,0	5,80	41,0	1,50	5,00	26,0	3,40	9,50	0,250	0,210	0,085	0,670
Sb	Te	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm
1,60	0,360	4,50	41,0	6,40	13,0	1,50	5,80	1,10	0,24	0,98	0,16	0,820	0,180	0,580	0,060
Yb	Lu	Hf	Ta	W *	Re	Pt *	Au *	Tl	Pb	Bi	Th	U			
0,490	0,077	0,670	0,310	0,690	0,01	<0,5	<0,50	0,12	5,00	0,15	2,80	4,30			

Rasm

HTUT D....html



Saponit minerali rentgenorammasi



## НАУЧНО-ЛАБОРАТОРНЫЕ ИЗЫСКАНИЯ

Таблица 1

Результаты полуколичественного рентгенофлуоресцентного метода анализа отобранных проб

№ и наименований проб	Элементный состав сапонитовых руд, %									
	Ca	Si	Fe	Mn	Sr	Сu	Ti	V	K	Орг. смес.
№1 – верхний слой	76,0	12,1	8,8	0,14	0,11	0,05	0,7	0,02	1,40	0,68
№2 – нижний слой	75,3	13,2	8,9	0,13	0,11	0,05	0,7	0,02	1,46	0,56

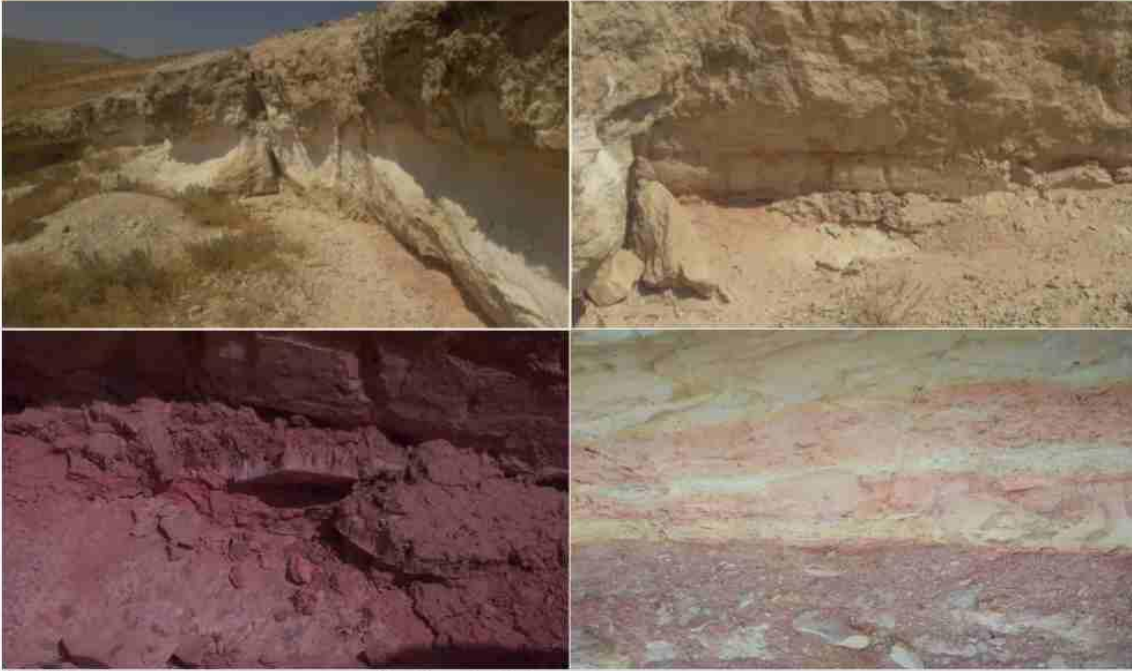


Рис. 1. Общий вид минералов сапонита в руднике Вауш Навоийской области

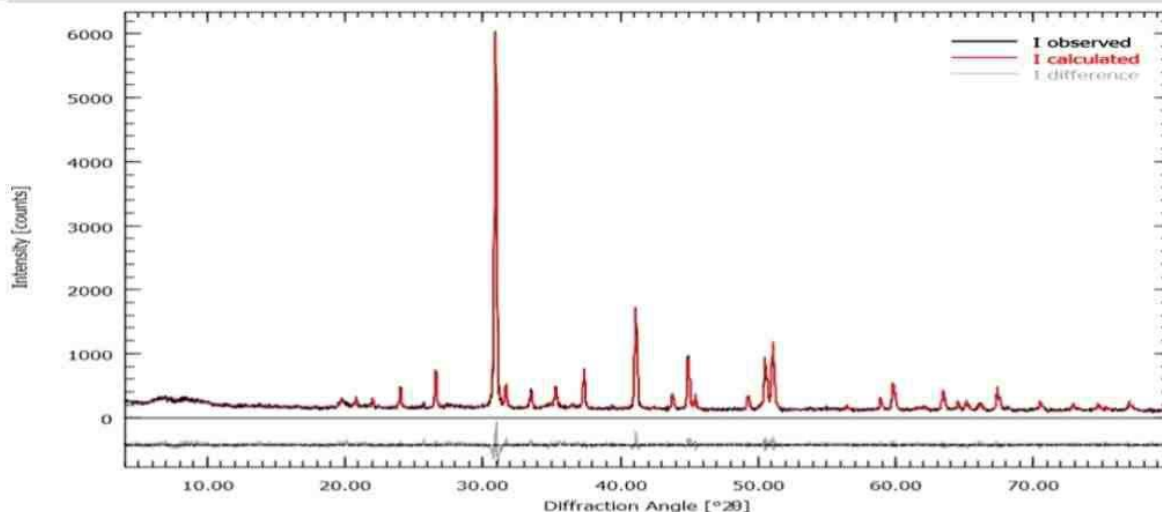


Рис.2. Спектр рентгенофазного анализа минерала сапонита

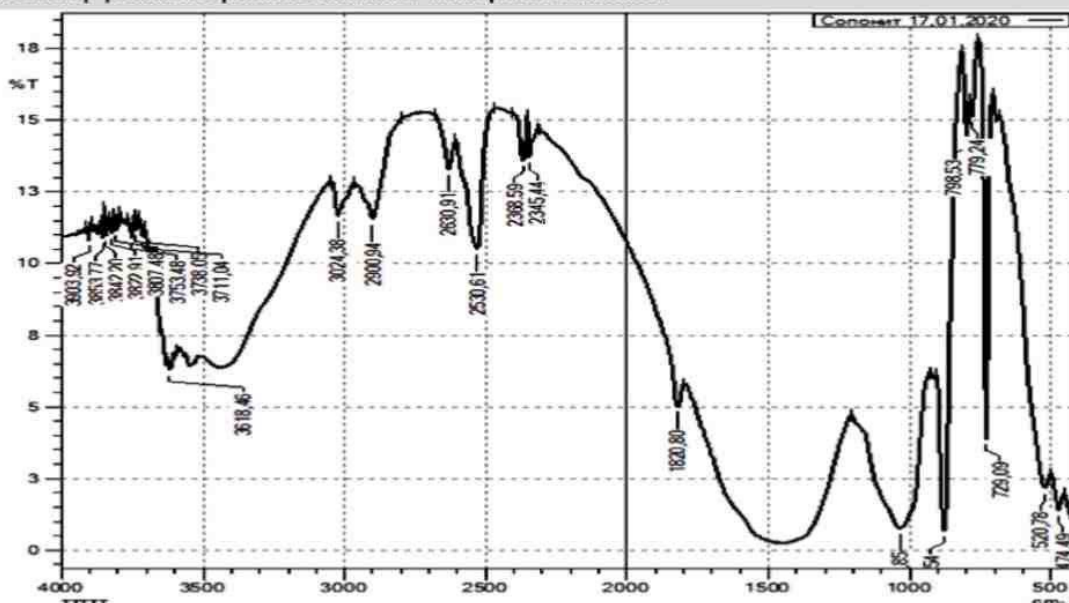


Рис.3 Спектр ИК-спектрометрического анализа сапонита на приборе IRTRACER-100 SHIMADZU

Saponitdan foydalanish samaradorligini oshirishda ba'zi Ultra elementlar muhim rol o'ynaydi[10]. Masalan, saponitda 0,0002 dan 0,00033% gacha bo'lgan lityum hayvonlarning qoni, to'qimalari va organlarining bir qismidir[12]. Ortiqcha Na va K tanadan siydik bilan chiqariladi va lityum ionlari natriyni hujayralar va to'qimalarga tashishga yordam beradi. Uning tuzlari asab tizimiga foydali ta'sir ko'rsatadi, stressni yo'q qiladi[11]. Saponitda 0,05-0,08% gacha bo'lgan xrom gematopoetik jarayonlarda muhim rol o'ynaydi va fermentatsiya tizimida ishtirok etadi, glyukoza almashinuvi jarayonlarida ishtirok etadi[21]. Molibden ba'zi fermentatsiya jarayonlarida faollashtiruvchi hisoblanadi. Jigar, buyraklar va endokrin bezlarda to'planadi[13]. Ko'pgina makro va mikroelementlar tirik organizmlar uchun juda muhimdir. Masalan, hayvonlar tanasida juda oz miqdorda bo'lgan kremniy kisloroddan keyin, biologik muhit bilan eng ko'p bog'langan element hisoblanadi[14]. Saponitda, masalan, ovqat hazm qilish, peristaltika va venoz tizimning barcha klapan tizimlarini tartibga soluvchi noyob germaniy elementi mavjud[20]. Saponitda kolloid shaklda mavjud bo'lgan oltin

va platina bakteritsid vazifasini bajaradi[15]. Vismut bakteritsid sifatida ham muhim rol o'ynaydi. U shish va diareyaga qarshi vosita sifatida ishlaydi, qizilo'ngach yuzasida plyonka hosil qiladi, bu uni tirnash xususiyati ta'siridan himoya qiladi[16]. Bu saponitdagi mikroelementlarning tirik organizmga foydali ta'sirining to'liq ro'yxati emas. Saponitning 80 ta namunasini tahlil qilish uning tarkibida toksik va radioaktiv elementlarning yo'qligini ko'rsatdi:( mishyak, kadmiy, talliy, seziy, uran va boshqalar)[17].

Dunyoda mineral kam tarqalgan deb hisoblanadi va yirik konlarning etishmasligi tufayli cheklangan foydalanishga ega. Masalan, Yaponiyada 10 dan 30 sm gacha bo'lgan tomirlar (Vakamatsu koni), buyuk Britaniyada saponit konlari (yadro quvvati 1-5 sm) ma'lum[18]. Dunyoning turli joylarida olingan (magniy miqdorini kamaytirish maqsadida) o'rganilgan saponit konlarining 23 ta kimyoviy tahlilidan barbar konining saponiti eng kam miqdorni o'z ichiga oladi. Xususan, Varvarovskoye konining o'ziga xosligi shundaki, dunyoda birinchi marta Ukrainadagi bunday yirik saponit koni kashf etilgan va batafsil o'rganilgan, ayniqsa ekologik jihatdan toza[19].

Saponitni qo'llash doirasi juda keng. Ushbu mineraldan quydagi holatlarda foydalanish mumkin:

1. ozuqalarga murakkab mineral qo'shimchalar ishlab chiqarishda. Qo'shimcha qoramol, cho'chqa, parranda va boshqa hayvonlarni boqish samaradorligini oshirishga yordam beradi;
2. makkajo'xori, kuzgi bug'doy, qand lavlagi hosildorligini oshirish;
3. texnogen va radiatsiyaviy ifloslangan tuproqlarni zararsizlantirish uchun;
4. sut, sut mahsulotlari va boshqa suyuq oziq-ovqat mahsulotlarini og'ir metallar va radionuklidlarning tuzlaridan tozalash uchun;
5. engil gözenekli plomba moddalarini ishlab chiqarish uchun;
6. qumli va sod-podzolik tuproqlar uchun kompleks ta'sir melioranti sifatida;
7. tuproqning tabiiy deoksidlanishi, pH darajasini neytralga kamaytirish uchun;
8. silos ozuqasi uchun tabiiy konservant sifatida;
9. ildiz ekinlarini saqlash muddatini ko'paytirish vositasi sifatida;
10. makkajo'xori, bug'doy, arpa va boshqalarning nam donalarini tabiiy ravishda saqlash uchun.;
11. dori-darmonlarni ishlab chiqarish uchun xom ashyo sifatida (xun takviyeleri va adsorbentlar). Saponit inson, hayvonlar va o'simliklar tanasidan radionuklidlarni olib tashlashga yordam beradi;
12. temir javhari kontsentratlarini zarb qilish uchun xom ashyo sifatida.

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