

## TANNIY POLYMER ASOSIDA OLINGAN KOMPOZITLARNING SORBSIYA XUSUSIYATLARI

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### ANNOTATSIYA

*Ushbu maqolada tanniy polymer kompozitlarining xossalari tahlil qilingan. Maqolada nazariy ilmiy tadqiqotlarning fikrlari va amaliy hisob-kitoblar ko'rsatilgan. Shuningdek adsorbtsiyasining o'ziga xosligi, u adsorbentlarni nisbatan yaqin solishtirma sirt yuzasi va g'ovakligini aniqlashning imkoni mavjudligi haqida so'z boradi. Xulosa qismida MTMS dan sintez qilingan kam zichlikka ega bo'lgan keremnezemning kuchli gidrofoblik xususiyati aniqlangan.*

**Kalit so'zlar:** gidrofil-gidrofob, selluloza tola, adsorbent, kremnezem.

### АННОТАЦИЯ

*В данной статье проанализированы свойства танний полимерных композитов. В статье приведены мнения теоретических научных исследований и практических расчетов. Также говорится о специфике адсорбции, возможности определения относительной площади поверхности и пористости адсорбентов. В заключение следует отметить, что керамика низкой*

плотности, синтезированная из МТМС, обладает сильными гидрофобными свойствами.

**Ключевые слова:** гидрофильно-гидрофобные, целлюлозное волокно, адсорбент, кремнезем.

### ANNOTATION

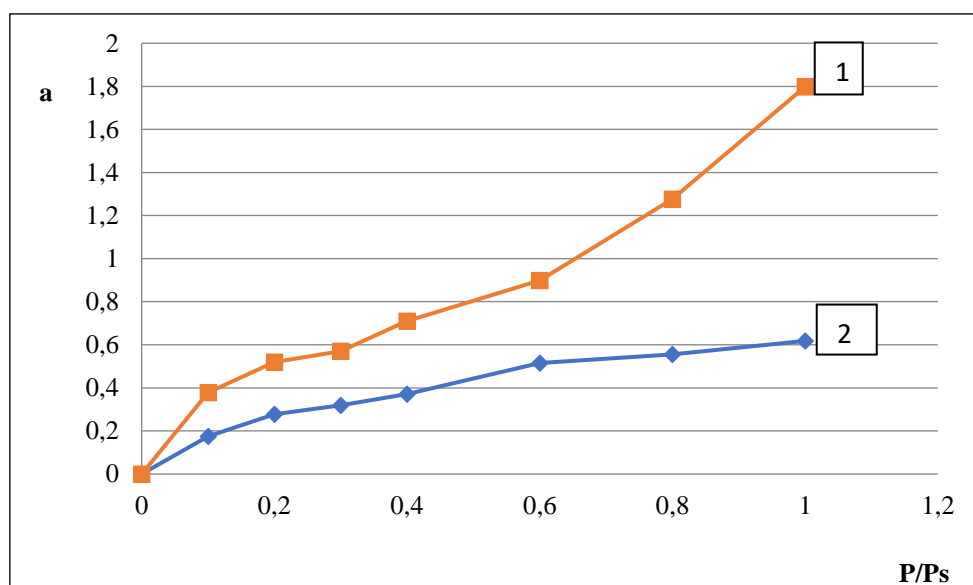
*This article analyzes the properties of tanniy polymer composites. The article shows the opinions of theoretical scientific research and practical calculations. It also talks about the specificity of adsorption, the possibility of determining the relative surface area and porosity of adsorbents. In conclusion, low-density ceramic synthesized from MTMS has strong hydrophobic properties*

**Key words:** hydrophilic-hydrophobic, cellulose fiber, adsorbent, silica.

Bugungi kunda selluloza-kremnezem kompozitlari istiqbolli innovatsion materiallar sifatida qaralmoqda. O'ziga xos xususiyatlarning xilma-xilligi tufayli ular turli maqsadlarda: katalizatorlar, membranalar, himoya qoplamalari, datchiklar, sorbtsiya materiallari sifatida turli sohalarda keng qo'llaniladi. Shuning uchun belgilangan fizik-kimyoviy xossalarga ega bo'lgan arzon, yuqori samarali va ekologik toza materiallarni yaratish alohida ahamiyat kasb etadi. Tibbiyot, dori-darmon va oziq-ovqat sanoatining turli sohalarida sintetik materiallar asosidagi qadoqlanuvchi materiallardan foydalanish hajmining ortishi ularni utilizatsiyalanishi, bio parchalanishi nuqtai nazardan kompleks xossaga ega bo'lgan kompozitsion materiallarni yaratish ham dolzarb vaziflardan biri hisoblanadi. So'nggi yillarda polimerlar bilan ishlaydigan adqiqotchilarning qiziqishi selluloza, uning efirlari va ularni boshqa tabiiy polimerlar, shuningdek, kremnezem bilan kompozitlariga qaratilmoqda. Bunda asosan ularning gidrofil-gidrofob xususiyatlarining boshqarilish imokoni mavjudligi sabab bo'ladi. Selluloza efirlarining suvda eruvchanligi, olinish usulining oddiyligi va fiziologik indeferentligi ularning zararli emasligini ta'minlaydi.

Metil trimetoksisilan SEAS va NaKM saralashmalaridan olingan plyonkalarni sorbtsiyalanish xossalari o'rganish muhim hisoblanadi. Quyi molekulyar moddalarni polimerlarga adsorbtsiyasi mexanizmi murakkab bo'lib, polimerning fazoviy va fizik xossalari, strukturaning g'ovakligi, kimyoviy tuzilishi, zanjirning mustahkamligi, adsorbatga nisbatan termodinamik jihatdan o'xshashligi va molekulalararo ta'siri kabi omillarga bog'liqdir. MTMS, NaKMS va sellulozaning hosilalarini termodinamikasini o'rganishda adsorbtsiyalanish xossalari o'rganilmagan. Shu sababl ilmiy ishda ularning adsorbtsiya termodinamikasiga chuqur e'tibor berildi. 1-rasmda MTMS,

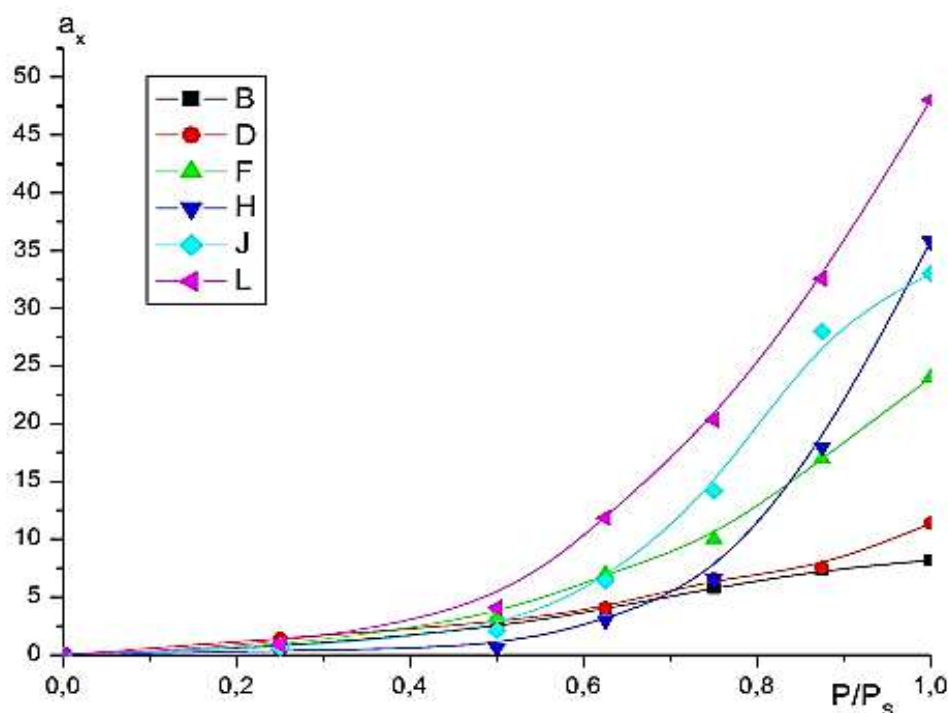
NaKMS, SEASning 1:1:1 nisbatda olingan kompozitga benzol va suv bug‘larining adsorbsiya izotermasi keltirilgan.



1-rasm. MTMS, NaKMS, SEAS hamda MTMSning benzolni sorbsiyalash izotermalari (1 – benzol bug‘i , 2- suv bug‘i)

1-rasmda ko‘rinadiki: izotermaning egri chiziqlari  $P/P_s$  qiymatlari katalashgan sari izotermaning egri chiziqlari ko‘rinishiga qarab nisbiy bosimning boshlang‘ich sohalarida polimolekulyar adsorbsiya sodir bo‘lgan, deb xulosa qilish mumkin. Nisbiy bosimning yuqori sohalarida  $P/P_s > 0.4$  bo‘lganda esa Brunauer nazaryasiga asosan monomolecular adsorbsiya sodir bo‘lmoqda. Demak ushbu kompozitning gidrofobaktiv markazlari shu nisbiy bosimlargacha benzol bug‘i bilan polimolekulyar adsorbsiyalanishini keyin esa mono molekulyar adsorbsiyalanish sodir bo‘lar ekan. U rivojlangan kapillyar-g‘ovak sistemaga, namlik va temperature kabi tashqi sharoitlarga bog‘liq.

2-rasmda ko‘rinib turganidek, izotermaning egri chiziqlari boshlang‘ich maydon bosimining o‘qiga nisbatan, erituvchida cheksiz aralashadigan shishasimon polimerlarga xos bo‘lgan,  $P/P_s$  sonqiymatila riyuqorilashgan qismida qavariq S-simon tuzilishga ega.



2-rasm: SEATs va Na-KMS asosidagi polymer kompozitningsuvbug‘larinisorbtsiyalashizotermalari (B-SEAS; D-4/1; F-3/2; H-2/3; J-1/4; L-NaKMS)

Boshlang‘ich sohapolimer-erituvchi sistemasida polimer adsorbatlarining fizik adsorbtsiyalanish jarayonlarini bir vaqtda sodir bo‘lishiga javob beradi. Izoterma egri chiziqlarining joylashuviga qarab, turli jinsli makro molekularning ta‘sirini taxmin qilish mumkin. Ushbu – rasmlardan o‘rganilgan namunalarning izotermasi S simon. Brunauerning fizikaviy adsorbtsiyalarning izotermalarini shakllari klassifikatsiyasini 2-turiga mansub ekan. 2-rasmdagi izotermalardan ko‘rinib turibdiki, boshlang‘ich moddalar bo‘lgan SEAS va NaKMSlarning suv bug‘i bilan adsorbtsiyalanishida nisbiy bosim boshlang‘ich sohalarda ya‘ni  $P/P_s = 0.2-0.4$  oralig‘igacha monomolekulyar adsorbtsiyalanish sodir bo‘lib keyinchalik polimolekulyar adsorbtsiyalanish sodir bo‘lmoqda. O‘rganilgan boshlang‘ich namunalar ya‘ni SEAS va NaKMS da mavjud gidrofobaktiv markazlari shu nisbiy bosimlargacha adsorbat bilan mono qavatlar hosil qilib, undan so‘ng esa poli qavatlar hosil qilib adsorbtsiyalanar ekan. 2-rasmdagi SEAS va Na-KMS dan tayyorlangan turli xil aralashmalardan olingan plynkalarimizni esa suv bug‘idagi adsorbtsiyalanishida nisbiy bosim nisbatan o‘rta sohalarda ya‘ni  $P/P_s = 0.4-0.6$  oralig‘igacha monomolekulyar adsorbtsiyalanish sodir bo‘lib keyinchalik polimolekulyar adsorbtsiyalanish sodir bo‘lmoqda. Bundan shuni bilishimiz mumkinki

ushbu nisbiy bosimlargacha izotermalar Lengmyur simon bo'larekan. SEAS va Na-KMS dan olingan plyonkalarni sirt yuzasida mavjud gidrofobaktiv markazlari shu nisbiy bosimlargacha suv bug'i bilan monomolekulyar adsorbtsiyalanishini keyin esa polimolekulyar adsorbtsiyalanish sodir bo'larekan. U rivojlangan kapillyar-g'ovak sistemaga va biosintezining yo'llariga, qaytaishlashiga, namlik va temperature kabi tashqi sharoitlarga bog'liq. Murakkab molekulyar ustki tuzilishga ega. Tabiiy polisaxaridlar gidrofil qutbli moddalar bo'lib, bug' yoki suv fazalaridan suvni yutish qobiliyatiga ega.

Metil trimetoksisilanning zol-gel polymerlanish ijarayoniga muhit pH ining ta'siri o'rganildi. Bunda muhit pH qiymatining ortishi bilan olinadigan kremnezemning gidrofiligi kamayib, gidrofoblik xossalari ortib borishi aniqlandi. pH=10.01 da sintez qilingan kremnezem super gidrofoblik ( $\theta_2=121.34^\circ$ ) ni namoyon qildi. Selluloza-kremnezem kompozitlarining hosil bo'lishida molekulalararo gidroliz borishi hamda vodorod bog'larining hosil bo'lishi IQ-spektroskopiya orqali ko'rsatib berildi. Selluloza-kremnezem kompozitlari morfologiyasi SEM yordamida tadqiq etilganda kremnezemning marjonsimon strukturasi orasida selluloza makro molekulasining kirib borishia niqlandi.

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