

DEPENDENCE OF THE MECHANISM OF N-HEXANE ADSORPTION ON THE DEGREE OF SATURATION IN NaL ADSORBENT**Turabov Bahodir Alikul ugli**

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Abstract:

Differential entropies and thermokinetics of n-heksane adsorption in the NaL adsorbente were measured at 303K. The detailed mechanism of n-geksane adsorption in NaL adsorbente from zero filling to saturation was discovered.

Keywords: Differential entropies, and thermokinetics, ion-molecular complexes, NaL adsorbente, nheksane, adsorption calorimetry.

INTRODUCTION.

Adsorbents are crystalline silicates and aluminosilicates linked through oxygen atoms, forming well-defined three-dimensional structures with water, cations, pores, and channels [1].

In 1756, mineralogist Fredrik Cronstedt developed a porous product formed by the interaction of raw materials and observed that upon heating it, large amounts of adsorbed water vapor were formed [2].

Adsorbent pores have long been used to create confined nanostructures for optoelectronics, such as metal clusters, [3] quantum dots or lanthanides and the number and efficiency of adsorbent-based applications in functional compositions and effect pigments [4] are increasing.

The size, topology and chemical nature of the adsorbent pores are due to the remarkable diversity of supramolecular systems that are present in the adsorbent pores, and the compounds consist of spherical clusters in the pores of LTA zeolites, polygons in the large-pored VPI. This explains the high resistance of confined water aggregates to mechanical stress. Under very high pressure, zeolites contribute to the formation of a complex arrangement of guest molecules, which act as a "support" for the pore structure, which and it prevents the breakdown of the carcass under the influence of pressure [5].

Thus, the high strength of hydrogen bonds in water may be due to its direct interaction with the bridging oxygen bound to aluminum, which is known to have the character of a Bronsted base [6]. Therefore, we can see that all hydrogen bonding interactions are enhanced and the covalent O-H bonds of water are significantly weakened. These two "solvated" water molecules, i.e., the combination of 5-hydrogen bonds and the hydrogen bonds surrounding the water with the nearest acceptor molecule can be considered similar. It is worth noting that the above results are obtained from a structure with a minimum energy of 0 K. It is assumed that both temperature and quantum effects (e.g., proton channels and zero-point energy) can lead to the true dissociation of water [7]. The unique structural conformation of hydrogen bonds within the adsorbent L channels, which contains a highly coordinated water molecule, is functional for the experimentally observed ionization of water under confined conditions [8].

MATERIALS AND METHODS.

The differential heat of adsorption was measured in a DAK 1-1 calorimeter of the Tian-Calve model. Adsorption isotherm was determined using volumetric method. The convenience of this method is that it helps to enrich the theoretical knowledge of adsorption based on

thermodynamic laws. This device is adapted only for the determination of adsorption quantities. The adsorption isotherm has an accuracy of 0.1% and a heat of 1%.

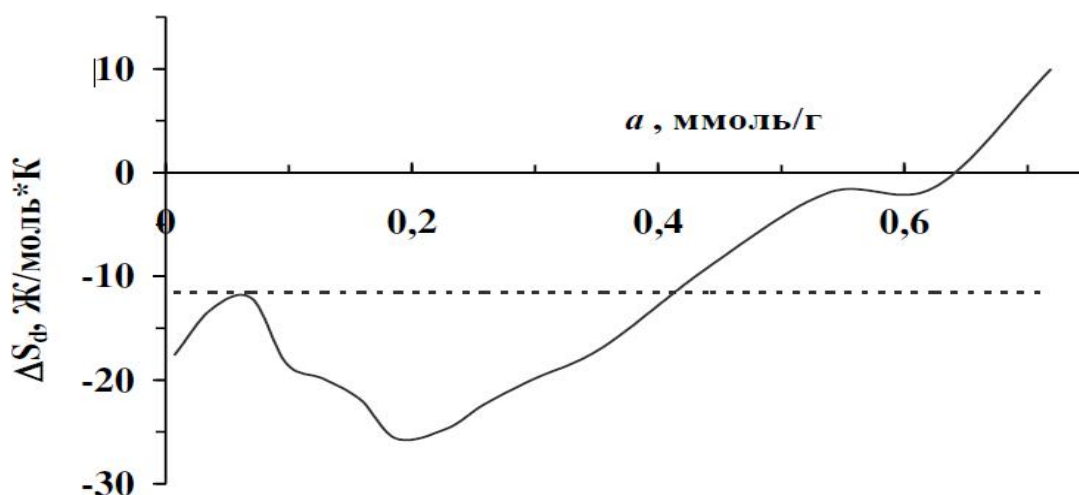
The n-hexane obtained as adsorbate was purified and dried under vacuum conditions before use in sorption. The dissolved gases were removed until its vapor pressure was the same as the vapor pressure data given in the tables for pure n-hexane. NaL in the adsorbent n-hexane adsorption 303 K also take It's gone.

RESULTS AND DISCUSSION.

Figure 1 shows the differential entropy of n-hexane adsorption on NaXL adsorbent. The differential entropy was calculated using the Gibbs-Helmholtz equation formula using the values of the differential heat and isotherm of n-hexane adsorption on NaXL adsorbent.

$$\Delta S_d = \frac{\Delta H - \Delta G}{T} = \frac{-(Q_d - \lambda) + A}{T}$$

λ -heat condensation, ΔH and ΔG -enthalpy and free energy change, T -temperature, Q_d -average differential heat.

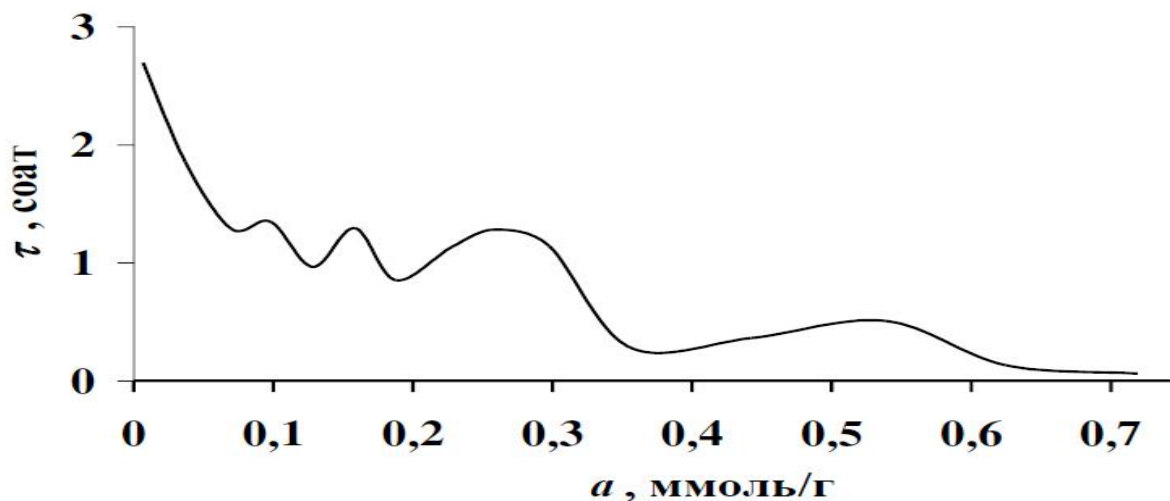


1-Fig. NaXL at 303 K entropy of n-hexane adsorption on the adsorbent. The entropy of liquid n-hexane is taken to be zero. Horizontal short-line average molar integral entropy.

This situation can also be observed in the entropy curve according to the undulating curve of the heat of adsorption. On surfaces, the curve is smaller than the entropy value of liquid n-hexane, indicating that the mobility of n-hexane is close to that of solid n-hexane. In this case, it is lower than the entropy of n-hexane and close to the entropy of the solid state. also this in my layer n-hexane mobility relative to mobility in liquid n-hexane somewhat slows down. Average the molar integral entropy is -11.54 J/mol*K, so the state of n-hexane in the n-hexane NaXL adsorbent system is similar to a liquid. It can be seen from the differential entropy plot that the entropy lines are higher than the average integral entropy line at adsorptions of 0.005 mmol/g and 0.42 mmol/g. Based on these entropy values, it is indicated that 76.3% of the adsorption is localized on the adsorbent surfaces.

Adsorption equilibrium time shows that at 0.01 mmol/g, the adsorbent is sorbed on the surfaces and the differential heat is high, so the equilibrium time (thermokinetics) is also high

(Fig.2). This in phase n-hexane molecules in the range of 2.7 to 1.29 hours. The large number of empty spaces in the NaXL adsorbent cells and the large amount of time it takes for n-hexane to decompose and reach equilibrium. Next stage surface on the surfaces the equilibrium time for adsorption is 1.5-1.75 hours.



2-Fig. Equilibrium time of n-hexane adsorption on NaXL adsorbent at 303 K.

As the adsorption process is completed, the equilibrium time gradually decreases from 1.2 hours to 20 minutes. decreases. The Rakhmakariyev effect was used to accurately calculate the differential heat of adsorption processes and the settling time of equilibrium. This makes it possible to accurately calculate the time of equilibrium decision.

CONCLUSION.

The average integral entropy value is $-11.54 \text{ J/mol}\cdot\text{K}$. The adsorption equilibrium time initially starts at 2.7 hours and decreases to a few minutes depending on the adsorption of NaXL adsorbent on the surfaces. The synthetic NaXL adsorbent adsorbs a total of 0.72 mmol/g of n-hexane.

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