

STUDYING ADSORPTION AND DESORPTION PROCESSES OF Ag NANO-PARTICLES ON NANO-POROUS CARBON ADSORBENT AU-L

M.G.Ismailova, N.A.Abzalova and A.A.Abzalov

*The Tashkent pharmaceutical institute, Tashkent, Republic of Uzbekistan
The Institute of physical chemistry and electro-chemistry named after A.N.Frumkin of
RAS, e-mail: akmal.38@yandex.com*

In recent years it is shown a big interest in development and research of carbon nano-materials. There have been carrying out active works in the field of obtaining fullerenes, carbon nano-tubes, nano-diamond and other types of nano-fragmentated carbon. However, all these materials are in high-disperse condition that limits the possibilities of their practical use. One of solutions of this problem can be the creation of nano-porous carbon materials containing in their structure metallic nano-particles, which in view of bactericidal properties can be applied in medicine, biotechnology, and also as filtering agents for purifying water and air.

The aim of this research is studying kinetics of adsorption and desorption of Ag nano-particles (NP) on the surface of AU-L carbon adsorbent for obtaining high-quality composite material.

Nano-porous AU-L carbon adsorbent with micro- and supermicropores' sizes of = 0,33-0,51 nm was obtained from cotton hydrolysis lignin by the method of carbonization and further steam-gasous intesification and has the following descriptions – specific surface $S_{sp} = 900-1300 \text{ m}^2/\text{g}$, total volume of pores $V_{\Sigma} = 1000-1100 \text{ cm}^3/\text{g}$, volume of micropores $V_m = 0,4-0,45 \text{ cm}^3/\text{g}$.

For obtaining nano-size particles of metals, in particular Ag NP were used radiation-chemical and biochemical methods of reduction metals' ions in reverse micelles.

With the aim of obtaining carbon composite materials containing Ag NP into the micellar solutions of nano-particles for definite time were dipped the tested samples and measured the intensity change of optic absorption stripes in UV and visible spectrum's area in «UNICO» spectrophotometer. The results of spectrophotometric researches of changing the content of metals' NP in micellar solution on the account of adsorption on the surface of modified samples are presented in fig. 1.

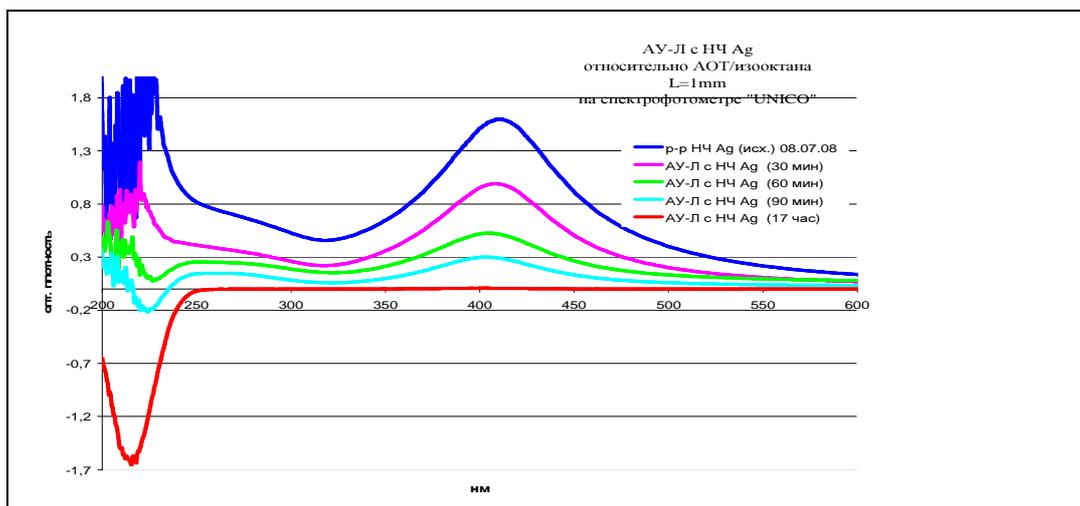


Fig. 1 Spectrum change of solutions' optic densities in adsorption of Ag NP on carbon adsorbent AU-L.

Then, with the aim of detection the fixing strength of Ag nano-particles was studied their desorption of the adsorbent in liquid phase. The obtained results are graphically presented in fig.2.

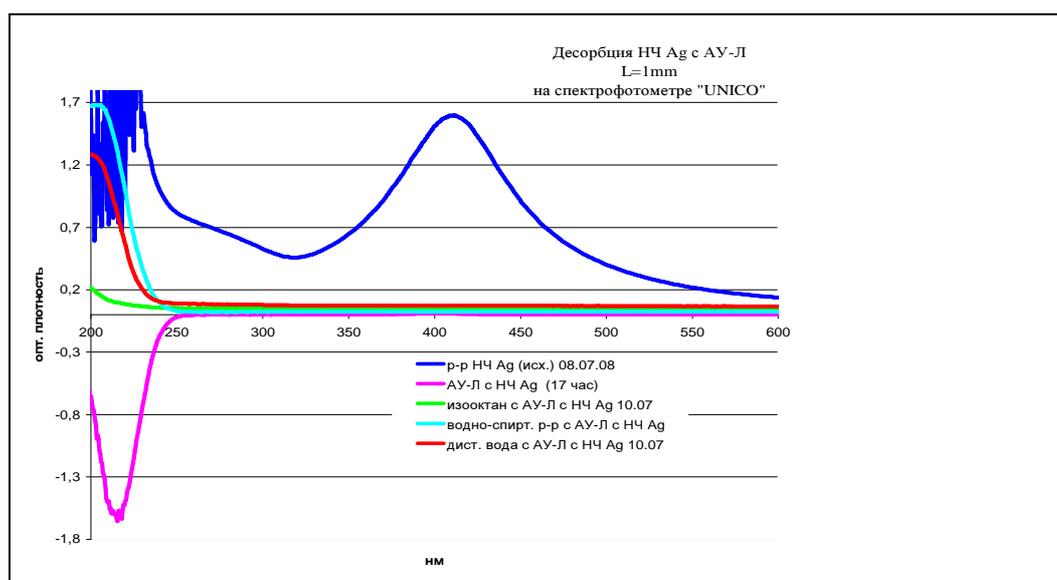


Fig. 1 Spectrum change of solutions' optic densities in adsorption of Ag NP from carbon adsorbent AU-L.

Thus, proceeding from the results of spectrophotometric researches it is shown that Ag nano-particles are well and firmly adsorbed on the surface of AU-L, during this time its porous structure is significantly changed – Ag nano-particles adsorbing in micropores block them, and adsorption ability of the adsorbent is carried out on the account of meso- and micropores.