

# **CARBON SORBENTS ON THE BASE OF VEGETABLE RAW MATERIALS IN THE PROCESSES OF THE EXTRACTION OF OIL PRODUCTS FROM WATER MEDIA AND ALKALI-OIL EMULSIONS**

Kravchenko O.V., Lapko V.V., Shvets D.I.  
*Institute for sorption and problem of endoecology of NAS of Ukraine,  
03680, Kyiv-164, Gen.Naumov str., 13, Kyiv, Ukraine*

Corresponding author e-mail address: [dshvetz@ispe.kiev.ua](mailto:dshvetz@ispe.kiev.ua); [dshvetz@ispe ldc.net](mailto:dshvetz@ispe ldc.net)

## **INTRODUCTION**

Problem of contamination environments by oil products gains the threatening scales and requires efficient ways of decision. One of the perspective ways of this problem decision is the use of sorption methods. The study in the field of physico-chemistry and technology for new carbon functional materials and development on their base a new processes of deep purification of water and alkali-oil emulsion from microquantities of oil products have allowed to develop the scientific bases of the directed syntheses and modifying of new carbon sorbents.

With the use of approach of regulation of hydrophobic-hydrophilic properties of the surface of the carbon matrixes, modified by hydrophobic compositions, for the first time by methods of the directed syntheses in conditions of low temperature carbonization of vegetable raw new hydrophobic-hydrophilic carbon material with high selectivity towards impurities of oil products and alkali-oil emulsions were received.

## **EXPERIMENTAL**

The purpose of the work is investigation of sorption properties of carbon sorbents in the processes of extraction of oil products from water environments and alkali-oil emulsion.

Objects of research: water ecosystems, model solutions, ground waters, technological solutions of washing stations, technological solutions, containing oil products.

As sorbents the carbon materials on the basis of vegetative raw were used.

The analyses of initial and purified water on content of impurities of oil products were carried out with using the methods of the chemical analysis by standard methods and State Standard [1].

## **RESULTS and DISCUSSION**

In the table 1 the data on efficiency of purification of water and composite technological solutions from impurity of oil products in dynamic and steady-state conditions with using of carbon sorbents are presented.

Table 1

## Sorption extraction of oil products from water and complex technological solutions

Objects	Impurities	Concentration of impurities	Degree of purification %	Fields of application
Water ecosystems, model solution	Petroleum	3-5 g/l	98-100	Purification of water of ecosystems
	Oil	1-4 mg/l	98-100	
	DF	1-2 mg/l	98-100	
Ground water	Kerosene	20-40 mg/l	99-100	Purification of ground water
Model solution, ground water	Kerosene	0,03-0,04 mg/l	99,9	Concentrating, metrological estimation of quality of water
Technological solutions, containing oil products	Motor oils, alkali-oil emulsions	3,5-4,0 g/l	95-100	Purification of technological solutions
Technological solutions of washing station	Motor oils, alkali-oil emulsions	0,1- 0,4 g/l	95-100	Purification of technological solutions

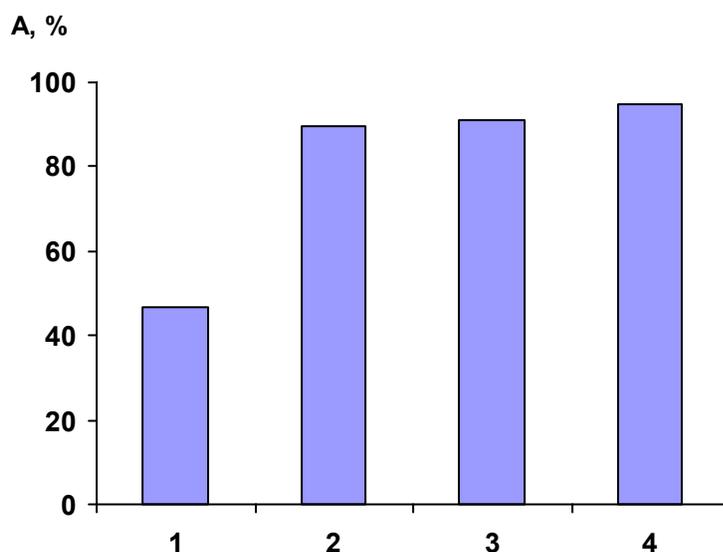


Fig.1. Influence of nature of sorption materials on the degree of purification of alkali-oil emulsion: (1 – biomass; 2 – carbon sorbent (fraction < 2 mm); 3 – composite carbon sorbent; 4 – carbon sorbent (fraction > 2 mm))

It was established, that purification of water and composite technological solutions from oil products with help special of carbon sorbent. The maximum degree of purification obtained at use of sorbent with fractional composition more than 2 mm (Fig. 1).

The possibility of modifying of carbon sorbents by halogen compound materials with purpose of increase of purification degree of water ecosystems from kerosene it was investigated (tabl. 2).

The availability in sewages the ions of heavy metals upsets the sorption and energy purification processes waste waters was found.

The intensification of purification processes of sewages from oil products at the presence of heavy metals ions can be reached by attachment of small amounts of organic compounds was shown.

The influence of organic compounds nature on the degree of complex purification of sewages is discussed.

**Table 2**

Purification of water ecosystems from kerosene

No	Type of materials	Ratio S: L	Initial concentration, mg/l	Equilibrium concentration, mg/l	Degree of purification %
1	Carbon dust	1:100	100	100	0
2	Active carbon	1:100	100	100	0
3	Carbonizate	1:100	100	6,0	94
4	Carbonizate (modification)	1:100	100	0	100
5	Carbonizate (modification)	1:200	100	1,5	98,5
6	Graphite	1:100	100	4,0	96

## CONCLUSIONS

The new carbon sorbents with hydrophobic properties allowed to provide deep purification of water and composite technological solutions from of oil products and solve the problems of industrial purification of water systems is shown.

The modifying of designed carbon sorbents by halogen compound materials allows to supply 100 % purification of water ecosystems and waste waters from kerosene is established.

The developed carbon material can be used as sensor sorbent at estimation of degree of purification of sewages from oil products is revealed.