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PRODUCTION OF DEAROMATIZED SOLVENT FROM KEROSINE

The development of new methods for the production of dearomatized solvents is an urgent need due to both environmental protection and the development of domestic production. Previously, a significant number of solvents was supplied from abroad, creating dependence on external suppliers. For these reasons, there is a need to create our own inexpensive and efficient technologies based on domestic raw materials that will allow us to produce dearomatized solvents of high quality.

The main methods of solvent dearomatization are catalytic hydrotreating, i.e. treatment of vapors of purified raw materials with hydrogen over a catalyst at high temperature; adsorption, activated clays and zeolites are used; extraction, usually with diethylene glycol, and sulfuric acid purification.

Straight-run kerosene (SrK) and kerosene fractions of vacuum gasoil (KF VG) were selected as the object of the study. The most feasible method of kerosene dearomatization is using sulfuric acid.

In the course of the research, such physical and chemical characteristics of the solvent as density, refractive index, molecular weight, aniline point, heat of combustion and a sulfur content test were determined. IR spectra were also taken to determine the content of aromatic hydrocarbons. In conditions of elevated temperature (95°C), sulfonation of kerosene showed the greatest efficiency. The results of the study are presented in Table 1.

Table 1 – 119 The results of the research

Characteristics	Measured value			
	SrK	KF VG	SrK (sulf)	KF VG (sulf)
Density, kg/м^3	784.7526	807.4065	768.3725	790.6176
Refractive index, %	1.4410	1.4490	1.3890	1.3900
Aniline point, °C	62.60	52.00	73.3500	68.6300
Sulfur content test, ppм	124.00	141.33	195.33	218.67
Heat of combustion, Дж/г	46175	45846	46688	46476
Content of ArH by peak area, vol. %	29.50	39.10	1.4363	3.2232
Content of ArH by peak height, vol. %	33.91	46.78	2.1591	4.4419

The table shows that the resulting solvent is dearomatized by more than 20 times. Further work will be aimed at reducing the content of aromatic hydrocarbons to 0.01%.

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KEY GENERATION BASED ON MOUSE MOVEMENT

Modern encryption and coding methods rely on numerical combinations or keys that must be unique and secure. Weak or repetitive combinations can lead to cracking. The unique key in copyright protection is the author's digital signature. Cryptographically resistant pseudorandom number generators (PRNGs) have a high degree of entropy due to unpredictable phenomena or physical activity (network activity, hard disk activity, keyboard activity, mouse movement, etc.) [1]. Mouse movements simulate two-dimensional chaos and can generate 256-bit keys, whereas 128-bit keys are sufficient for cryptographic security [2,3]. Micro-movements of the hand when using the mouse generate unique coordinates that differ even when the user's actions are the same. Mouse movements are also used to confirm identity, but this method is not exhaustive due to high entropy [4]. Random number generation is important in cryptography, modeling and statistical analysis. The method of key generation based on mouse movements involves collecting data on cursor coordinates, speed and direction of movement to generate a sequence of random numbers, providing a high level of security and unpredictability. To implement this method, it was necessary to determine the initial number of parameters that the key should contain, which will later be converted into the required format. At the basic stage it was decided to choose four parameters: 0X axis coordinate, 0Y axis coordinate, angle between two random sequence vectors and cursor movement speed between two fixed points. A square of size 1000×1000 px was chosen as the basic