

PREPARATION OF HYDROCARBON SOLVENTS FROM PYROLYSIS OIL

UzMU prof. Nurmanov Suvonkul Erkhanovich

Associate Professor of UzMU. Kodirov Orifjon Sharipovich

JizPI assist. Isakulova Mukaddas Shukurovna

i.mukaddas@mail.ru

Annotation *In this work, the production of pyrolysis oil from hydrocarbon solvents was studied. The chemical composition of the resulting solvent was studied. It was also used in practice in the production of automotive paints.*

Key words: *JV LLC "Uz-Dong Ju Paint Co.", LLC "Shurtan Gas Chemical Complex", benzene, toluene, xylene, JV LLC "Uz-Kor Gas Chemical", pyrolysis oil, pyrolysis distillate, tar product, xromatogram, Kocosol – 100, auto primer, auto putty, auto enamel, auto varnish, auto dye, auto protective agents, auto sealant, body.*

The automobile industry is part of an industry that is of great importance in the development of the country's economy and also contributes greatly to the development of other industrial sectors [1].

The development of the automotive industry depends on many factors. One of the main ones is the localization of parts necessary for the production of cars. Various autochemical products are used in the manufacture of automobiles. For example, auto primer, auto putty, auto enamel, auto varnish and various auto dyes, auto protective agents, auto sealants, chemical pre-treatment agents for the car body, etc. The composition of the products listed above consists of several ingredients, many of which are imported from near and far abroad.

Autochemical products are produced in our Republic at the Uz-Dong Ju Paint Co LLC JV enterprise. Almost all the raw materials used to produce the company's products are imported.

The pace of car production in our country is increasing every year. Accordingly, the demand for auto chemical products is growing. The main part of the composition of car varnishes and dyes consists of various solvents. The main chemical composition of auto chemical products consists of the following groups of substances: film-forming (binder), solvent, pigment, filler, plasticizer, desiccant,

Antioxidant, fire retardant, dispersant, emulsifier, stabilizer. etc. Substances in this group make up the main composition of paint and varnish products (LBM).

In industry, the production of such products based on domestic raw materials will certainly have a positive impact on the cost of the final product vehicle. Localization of paintwork is one of the main tasks of today. Our republic has raw materials that make it possible to produce the products listed above and are the primary and secondary products of the enterprises of the joint venture Uz-Kor Gas Chemical LLC , Shurtan Gas Chemical Complex LLC. Uzbekistan does not produce high-purity solvents, but there are raw materials and opportunities, you just need to introduce unique technologies. For example, at the enterprises of Uz-Kor Gas Chemical LLC and Shurtan Gas Chemical Complex LLC, using technological processes, benzene, toluene, xylene and their mixtures, C₉ aromatic compounds , C₁₀ aromatic compounds . Another raw material is waste from the enterprises of Uz-Kor Gas Chemical LLC and Shurtan Gas Chemical Complex LLC, obtained during the suspension polymerization process, solvent regeneration residues, processed hexane and low molecular weight polyethylene. With this in mind, scientific and practical developments in the field of solvents and diluents used for the production of auto chemical products are a requirement of the modern automotive industry.

Aromatic hydrocarbons – the most extensive group of hydrocarbon solvents produced by industry. Currently, aromatic hydrocarbons are mainly obtained from petroleum fractions by catalytic reforming and pyrolysis and, to a much lesser extent, by processing coal. The yields of aromatic hydrocarbons in these processes are approximately kg per 1 ton of raw materials:

Name	Coking of coal	Pyrolysis of naphtha	Catalytic reforming of naphtha
Benzene	6.0-6.5	7.0-9.0	5-10
Toluene	1.5	4.0-6.0	5-7
Xylenes	0.3	1.5-2.5	1-3

It is also known to produce aromatic hydrocarbons from shale gas gasoline, which contains more than 50% benzene [2] .

The domestic industry produces almost all aromatic solvents, including a mixture of aromatic hydrocarbons called solvent.

Aromatic solvents have a higher dissolving power compared to other hydrocarbon solvents and are included as constituent components in most mixed solvents [3] .

Pyrolysis condensate is produced in our Republic at the JV Uz-Kor Gas Chemical LLC about 120 thousand tons per year, fraction 1 is called pyrolysis distillate, obtained from 30 ° to 160 ° C, fraction 2 is called pyrolysis oil, this

fraction is obtained at 160 ° up to 270 ° C, fraction 3 is called tar product, it turns out above 270 ° C [1] .

Pyrolysis oil is an oil-based liquid with an unpleasant odor ranging from dark brown to dark green, the results of the analysis are presented in Tables 6 and Figure 6.

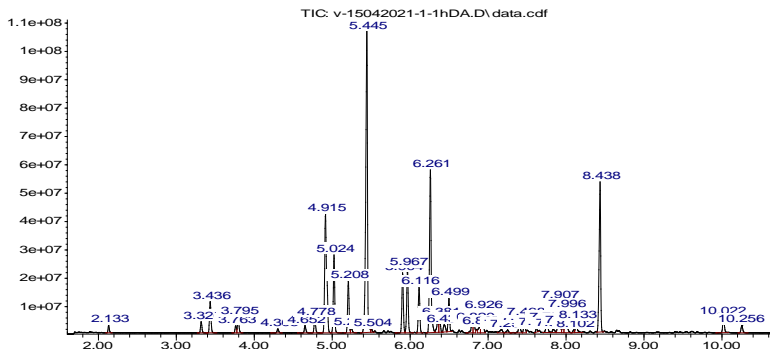


Figure 6. Oil pyrolysis chromatogram

Table 6. Chemical composition of the first fraction of pyrolysis oil

No	Substance name	Formula	Mass ion, %	Similarity, %
1.	o- Xylene	$C_6H_4(CH_3)_2$	2,05	97
2.	1-Methyl-3-ethylbenzene	$C_6H_4(CH_3)(C_2H_5)$	10,51	94
3.	1,2,4-Trimethylbenzene	$C_6H_3(CH_3)_3$	4,82	96
4.	1-Methyl-4-ethylbenzene	$C_6H_4(CH_3)(C_2H_5)$	3,23	97
5.	1,3,5-Trimethylbenzene	$C_6H_3(CH_3)_3$	22,39	95
6.	1,2,3-Trimethylbenzene	$C_6H_3(CH_3)_3$	3,86	70
7.	E-1-phenylpropene	$C_6H_5C_3H_5$	4,23	95
8.	2,3-dihydro-1H-indene	C_9H_{10}	2,94	93
9.	1H-Indene	C_9H_8	11,49	96
10.	1,2-Dimethyl-4-ethylbenzene	$C_6H_3(CH_3)_2(C_2H_5)$	2,01	97
11.	1-methyl-1H-indene	$C_9H_7CH_3$	2,80	96
12.	Azulene	$C_{10}H_8$	9,92	95

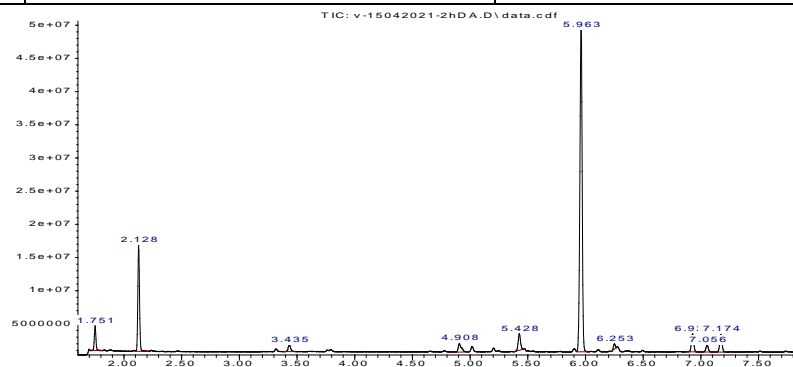


Figure 8. Chromatogram of a special solvent Koco s o l -100

Koco s o l - 100 - a special solvent is a transparent, colorless or light yellow liquid with an oily odor, the main composition of which is aromatic hydrocarbons, the analysis results are presented in Table 8 and Figure 8.

Table 8. Chemical composition of the special solvent Koco s o l -100

No	Substance name	Formula	Mass ion, %	Similarity, %
1.	1,2,4- trimethylbenzene	$C_6H_3(CH_3)_3$	8, 81	95
2.	1- ethyl -4- methylbenzene	$C_6H_4(CH_3)(C_2H_5)$	28, 30	94
3.	1,2,3- trimethylbenzene	$C_6H_3(CH_3)_3$	62, 89	91

The influence of the process conditions for obtaining a special solvent for auto dye products was studied, and alternative, relatively effective conditions were determined: process temperature for the solvent Koco s o l - 100 - 160-180 ° C, water concentration in the solvent - 0.01% (by weight), the duration of the distillation process is 35 minutes. Based on the above technological indicators, a solvent was obtained consisting of 99-99.5% C₉ aromatic hydrocarbons .

Technical and economic calculations showed the effectiveness of the proposed technological solutions. Of the solvents studied, the solvent “ Koco s ol 100” allows achieving economic efficiency of 8 900 000 soums per ton.

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