ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

ANALYSIS OF SYNTHESIS PRODUCTS AND PRODUCTION TECHNOLOGY

Xuseynov Ilxom Ibragimovich
Bukhara Engineering - Technology Institute
Magestrant

Safarov Baxri Jumayevich
Bukhara Engineering - Technology Institute
Teacher

Xo'jjiyev Ma'murjon Yangiboyevich
Bukhara Engineering - Technology Institute
Teacher

ANNOTATION

The world's most prestigious chemical and technological research institutes are working to develop the most efficient technological methods for obtaining environmentally friendly synthetic fuels. The question of what reactions produce the highest quality and pureest synthetic fuel, and how to bring such technology to the industrial scale, is one of the most pressing tasks facing chemists and engineers today in the field of synthetic fuels.

KEYWORDS: ***naphthalene, methane, ethane, propane, butane, olefins, diolefins, acetylene, benzene, toluene, xylenes, ethyl, isopropylbenzene.***

Annotatsiya

Ekologik bezarar sintetik yoqilg'i olishning eng samarali texnologik usullarini yo'lga qo'yish borasida hozirgi kunda jahonning eng nufuzli kimyo-texnologiya ilmiy dargohlarini izchil ish olib borilmoqda. Qaysi reaksiyalar natijasida eng sifatli va toza sintetik yonilg'i olinishi, bunday texnologiyaning sanoat miqyosiga olib chiqilishi masalalari hozirgi kun sintetik yoqilg'i masalalari bo'yicha izlanayotgan kimyogar-texnolog-muhandislar oldidagi eng dolzarb vazifadir.

Kalit so'zlar: Naftalin, metan, etan, propan, butan, olefinlar, diolefinlar, atsetilen, benzol, toluol, ksilollar, etil, izopropilbenzol.

INTRODUCTION

The development of the petrochemical industry is accompanied by an increase in the production of petrochemical products, as well as a certain general tradition. One such tradition is the expansion of technological devices. For example, in 1950–1960, the capacity of ethylene gas separators increased from 50,000 to 100,000 tons / year, and in 1960–1970, the capacity of such devices increased by 300,000-600,000 tons / year. Since 1970, the capacity of this type of newly built equipment has reached 900 thousand tons / year. However, the method of obtaining ethylene has not changed much - ethylene is obtained by pyrolysis in tube furnaces. The transition from 60,000 tons to 300,000 tons will reduce the cost of ethylene by about 50%. At the same time, the separation of butadiene and isoprene in high-capacity devices has become more profitable. Their combined content is about 15% in pyrolysis gas (compared to ethylene). Butadiene isolated from pyrolysis gas is about 1.5–2 times cheaper than dehydrogenated n-butane and n-butadiene. Since 1960, global ethylene production has increased from 3 million tons to 100 million tons. More than 40% of ethylene is used to make high- and low-density polyethylene.

There is a need to build processes that turn raw materials into high-quality products. For example, in the production of ethyl alcohol by direct hydration of ethylene, only 4–5% of ethylene is passed through the reactor, in the oxidation of cyclohexane to cyclohexanol and cyclohexanone, 4–5%, ethylene is high. 12–15% is converted into a product in the polymerization of high-density polyethylene. When the reaction is started at a low level, the re-introduction of the raw material that was

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

not involved in it reduces the profitability of the process. If energy is used for heating or energy purposes, its utilization in petrochemical processes is an important issue. In processes involving heat absorption, especially dehydrogenation, it is advisable to carry it side by side with exothermic processes, such as oxidative dehydration. [1]

It is safe to say that energy needs have become a global problem today. It is true that energy is the main source of development, so today in our country a lot of attention is paid to the production of polymer products from GTL "Gas to liquids", as evidenced by the construction of the Golden Road GTL. Purpose of the plant The plant annually produces more than 1.5 million tons of high-quality synthetic liquid fuel that meets the EURO 5 standard, including 743.5 thousand tons of diesel fuel, 311 tons of jet fuel, more than 431 thousand tons of naphtha. , Produces more than 50,000 tons of liquefied gas.

Gas to liquids (GTL) technology was developed in 1923 by German chemists Fisher and Tropsch and was used in the production of aviation fuel in Germany during World War II. Later, when wet oil began to be widely used, this technology was found to be economically viable. Currently, there is a widespread focus on the production of synthetic liquid fuels.

The introduction of GTL industrial processes into production will allow oil and gas companies (previously economically unprofitable due to the lack of transport infrastructure and the distance of the fields from the consumer) to engage in the production of large gas fields. Liquid fuel is more convenient to transport than gas. In addition, in oil-producing areas, torches burn large amounts of satellite gas, which causes great environmental and economic damage to gas-producing countries. One of the main reasons for the interest in GTL technology is that it makes it possible to transport gas from gas fields by pipeline or river transport when it is difficult to transport it. Another major reason is that increasing greenhouse gas emissions will prevent the deterioration of the world's environment. Synthetic liquid fuels are more environmentally friendly than gaseous petroleum fuels.

THE MAIN MECHANISM OF SYNTHETIC LIQUID HYDROCARBON TECHNOLOGY

There are four main ways to obtain synthetic gas:

i. The starting material is the gas (raw material) obtained by steam reforming using catalysts.
ii. Partial oxidation. Oxygen is separated from nitrogen in the separation of creogenic air and is burned at high pressure and temperature along with natural gas. Some technologies may use air instead of pure oxygen.
iii. Autothermal reforming. The process is based on partial oxidation, which involves steam reforming.
iv. A method of reforming natural gas by heating the gas in the presence of steam and oxygen.
v. In the Fisher-Tropsch synthesis process, three main technologies are used to obtain synthetic oil:
vi. Suspended catalytic process. In this process, the synthesis gas in the suspension reacts with the catalyst and dissolved paraffin from the reactor.
vii. Stationary Layered process. In this process, the synthesis gas moves through the tubes. Catalysts are pre-installed in the pipes.
viii. Fluidized layered process. In this process, the synthesis gas passes through the catalytic layer at high speed at high temperatures.
ix. The cheapest technologies are BP Amoco, Syntroleum, Exxon and DOE ceramic membrane technologies. Because this technology does not have an air separator. However, small-scale devices have been built using Syntroleum and Exxon technologies, and VR Amoso and Exxon technologies have been used to build industrial plants in the United States.
x. The most expensive technology is the technology provided by Sasol. But even with these technologies, large enterprises have been built in many countries.

1. Methane is a colorless, odorless gas. Molecular mass 16.04. Insoluble in water, soluble in ethanol, ether, carbon (IV) -chloride and hydrocarbons. Methane is the first representative of the saturated hydrocarbon series and, like other alkanes, undergoes radical substitution reactions (such as halogenation, sulfochlorination, sulfoxidation, nitration). Saturn, Jupiter and its companion Titan form the basis of the atmosphere. Methane is extracted industrially from natural gas or cracked gas by low-temperature distillation. Obtained in the laboratory from acetates, carbides or methyl halides of metals. Methane is used in the manufacture of fuel, synthesis and gas raw materials, hydrogen, acetylene, technical carbon, carbon (IV) chloride, chloroform, freons. It is non-toxic but forms explosive mixtures, which can cause problems in coal mines.

2. Carbon dioxide is a carbon dioxide, an oxygenated compound of SO_2-carbon, a colorless gas with a distinct pungent odor and taste. 00 and density under normal conditions is 1,977g / l, critical temperature is 31.30, critical pressure is 7.3 MPa.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

When cooled to -78.50, it turns into a snow-white solid - "dry ice". Solid SO_2 is also formed when liquid SO_2 evaporates rapidly. At normal pressure, at 78.50, it converts directly into a gas without liquefying. Solid SO_2 liquefies at a pressure of 5 MPa at -56.70. Soluble in water, alcohol and ether. In nature, organic matter is formed as a result of oxidative processes such as decay, fermentation and combustion. Fuel combustion also produces SO_2. SO_2 in the air is 0.03% by volume. SO_2 is a product of metabolism in the body. It is also involved in the process of photosynthesis. In the technique, limestone or nose is burned and the marble is decomposed with hydrochloric acid in the laboratory. SO_2 is widely used in the food industry, in the preparation of "dry ice", in firefighting, in the chemical industry in the production of urea, soda, oxycarboxylic acids, in blasting. When the amount of SO_2 in the air exceeds 1.5-3%, a person develops headaches, dizziness and nausea. If it exceeds 6%, the person loses the ability to work and his life is in danger. The victim should be taken to the open air and given artificial respiration.

3. Hydrogen is a colorless, tasteless, odorless gas. Soluble in water. Oxygen, carbon, and chromium form an explosive mixture. i. -density in air -0.072; ii. -density in the working building -300 mg / m3; iii. -REK traps - 4%; iv. -high- 74%; v. -spontaneous ignition - 510^0C; vi. - boiling point - 252.7^0C; vii. -freezing point - 259.2^0C; viii. -lusting temperature - $259,14^0$C. Vapor inhaled, toxic. Physiologically inert gas, weak (moderate) concentration leads to headache, insomnia, dizziness, malaise, salivation, vomiting and fainting.

CATALYSTS USED FOR THE PROCESS AND THEIR TYPES

Polymerization in alumomolebden catalyst: This process is carried out at a temperature of 130–260ºC and a pressure of about 70 atmospheres. The molybdenum oxide in the catalyst-spreading alumina is MoO_3, and the molybdenum oxide is 5–8%. Prior to the process, the catalyst is activated in a hydrogen stream at 430–480ºC, which shows that the high valences of molybdenum are partially reversed, i.e., it is a mixture of oxides similar to chromium oxide catalyst. Sometimes promoters (alkalis and alkaline earth metal hydrides and carbides) are added to the catalyst. In addition to molybdenum oxide, vanadium oxide can also be used. In practice, the technological design of the process is no different from that of the chromium oxide catalyst process. Nickel Catalyst Polymerization: This method of producing polyethylene at medium pressure is carried out at a pressure of 70 atmospheres and at 100-200 °C. The catalyst of the process is the metallic nickel or cobalt in the activated pistachio charcoal spreader. The amount of nickel in the catalyst increases from 3 to 10%. The catalyst can be activated with alkali metal additives. The catalyst is regenerated with hydrogen at 175–140ºC and 140 atmospheres. Considering the three methods of polyethylene production at medium pressure, the properties of the obtained polyethylene can be compared depending on which catalyst is used (Table-1).

Properties of medium pressure polyethylene
Table 1

Polymer properties	Used catalysts		
Molecular Weight Density, g / cm3 Crystalline Degree,% Melting point, ºC Number of CN3 groups per 1000 atom of carbon Breakfast strength limit, kg / cm2	$Sr_2O_3 \times SrO_3$, $Al_2O_3 \times SiO_2$	$MoO_3 - Al_2O_3$	Ni / coal
	10÷30 thousand	30–250 thousand	100–200 thousand
	0,95–0,96	0,95–0,97	0,94–0,95
	93	87	80
	123–133	128–131	117–120
	1,5	2,	20,0
		-	
	285		-

These data show that catalysts have a significant effect on the properties of the polymer obtained.

ALTERNATIVE GASOLINE PRODUCTION

There are three industries.

i. Gasoline from coal (destructive hydrogenation of coal).
ii. Gasoline (GTL - Gas Liquid);
iii. Ethanol.

The process of extracting gasoline from coal (destructive hydrogenation of coal) Destructive hydrogenation of coal was discovered in 1913 by German chemists F. Bergius and M. Pierre. It is based on high-temperature treatment of coal with water vapor and follows the following reaction

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

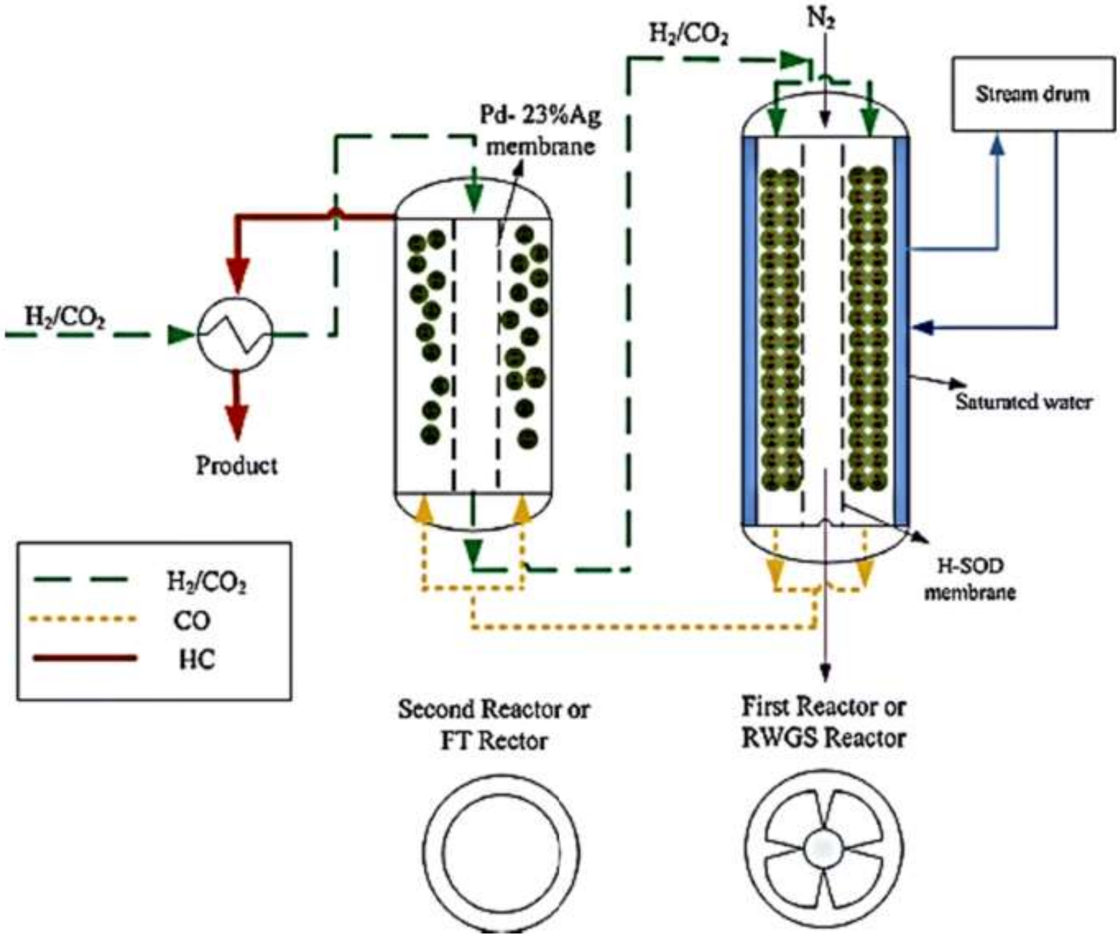

Figure 1. Synthesis gas production reactor

$C + H_2O \leftrightarrow CO + H_2$

$2C + H_2O + CO_2 \longrightarrow 3CO + H_2$

$3C + H_2O + O_2 \longrightarrow 3CO + H_2$

$C + H_2O \longrightarrow CO + H_2$

And then the liquid hydrocarbons that make up synthetic gasoline are obtained. This technology allowed to obtain liquid fuel in the presence of hydrogen at a temperature of 450 C and a pressure of 30-70 MPa. In 1926, German chemists F. Fisher and G. Tropsh proposed catalysts that allowed hydrocarbons to be obtained from aqueous gas (aqueous gas is a gas composed of CO and H2). Based on their research, an industrial process for the production of synthetic fuels was developed in Germany; and solid hydrocarbons (paraffins) are formed along with gaseous and liquid ones. Cobalt, nickel, and other Group VIII metals precipitated in alumina were used as industrial catalysts. According to Fisher Tropsch, the process of synthesis, such as the destructive hydrogenation of coal, was widespread in Germany during World War II: from 1942 to 1944, the production of synthetic liquid fuels based on lignite and coal was estimated at 5 million tons per year. m.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

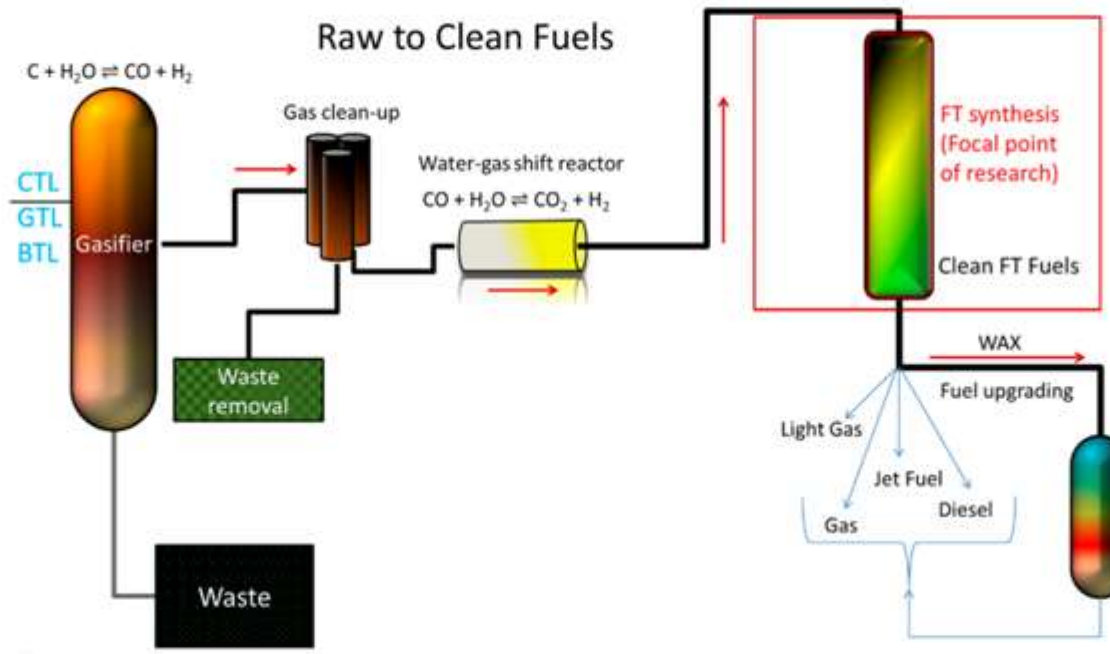

Figure-2. Technological scheme of the Fisher Tropsh synthesis process reactor

The production then went on to operate successfully in the Republic of South Africa (JAR) under conditions where the purchase of oil was prohibited for that country. It should be noted that in Germany, devices for this technology were discontinued in the 80s of the twentieth century, because gasoline from coal was much more expensive than oil. At the beginning of the 21st century, this process was revived by scientists from the VR oil company, but as Veba Sombi Cracker (VSS) as a process of extracting open oil products from heavy oil residues. Coal-based gasoline is not high quality, it has a low octane number. Diesel frets are also available. The resulting products are then hydrocracked. Gasoline Gas Processing (GTL) The process is based on the synthesis of gas to oxidize methane and the conversion of gas to liquid fuel. The use of GTL technology is advisable for the efficient use of gas resources that, for one reason or another, cannot be brought to market. Typically, this process is used in the efficient use of satellite oil gas in large gas fields and oil fields with high gas production. GTL technology requires a large amount of capital on an industrial scale and is very sensitive to changes in oil prices. The first plant with a capacity of 20,000 tons per year was built in 1991 in South Africa. Traditional GTL - products contain, in addition to methanol, acetic acid, olefins, dimethyl ether (can be used as a component of diesel fuel), urea ammonia, mineral fertilizers and synthetic hydrocarbons with different chain lengths . This technology can be used to produce low-boiling alkanes, polyoxymethylenes, naphtha, distillates used as gasoline, kerosene, diesel fuel, surkov oils and paraffin. By changing the synthesis conditions, aqueous gas-based oxygen-retaining gases, in particular alcohols - methanol and ethanol, are obtained, which can be used as a component of automotive gasoline, although they have certain disadvantages (they can be divided into layers when combined with gasoline, hydroscopy, corrosion activity, high evaporation heat). Currently, in the Middle East (Qatar), this technology has developed industrially (in 2010, Shell's technology converted 1.6 billion m3 of gas per year into gasoline, kerosene, diesel fractions and base oils for direct injection. The hydrocracking stage is required to improve the quality of the product.

Ethanol production Ethanol can be a direct fuel for gasoline engines and can be used as an additive to a gasoline component. G. Ford was one of the first to use ethanol as an engine fuel, inventing the ethanol-powered car (Model T) in 1880. For a long time, ethyl alcohol was not used as a fuel or fuel component due to its high cost and high hydroscopicity and insufficient strength. The widespread use of ethanol as a motor fuel began in many countries in the 1970s, marked by oil crises and sharply increased demands on the environmental properties of motor fuels. Ethanol obtained by hydration of ethylene and non-hydrolysis of food raw materials is called technical ethanol and is used for various technical purposes, including as motor fuel or its component. Phosphate-acid catalysts are used in the production of ethanol by direct hydrotreating of ethylene; The process takes place at a temperature of 260 - 280 C and a pressure of 7-8 MPa. The biggest disadvantage of the process is the low conversion of raw materials (4-5%) in one pass, which leads to the

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

need for recirculation of large amounts of unchanged raw materials and high corrosion aggressiveness of the catalyst and its removal from the reaction zone. The products of hydrolysis of wood are obtained by hydrolysis of alcohol. The shapes required for sawing are hydrolyzed by sawdust, wood chips and other wood processing wastes. The raw material (cellulose) containing polysaccharides is treated with 5% sulfuric acid at 180 C and 1 to 1.5 MPa, which leads to the formation of glucose, which is then fermented in alcohol. The ethanol obtained by this method is rectified in an aqueous solution. When ethanol is obtained from food raw materials, it is used in cereals, potatoes, sugar cane, corn and other plant products that store starch or hydrocarbons.

The essence of this method is to ferment these products using bacteria that convert hydrocarbons into ethanol. 95% and more "pure" ethanol is used as a motor fuel in small volumes, with various mixtures of ethanol with gasoline containing 5 to 85% alcohol being the most widely used. It uses mainly ethanol from renewable sources of plant raw materials called bioethanol. The production of bioethanol requires more energy from oil than the production of conventional fuel (gasoline). The energy required for planting, care, fertilizer production, harvesting, and processing (fermentation) of grain, sugar cane, or corn is almost equal to the energy produced by bioethanol. At the same time, the cost of producing fuel from oil is about 10-30% of the generated fuel capacity. Ethanol is the most widely used as a motor fuel in Brazil, due to the large potential for the production of ethanol from sugar cane, which is a plant raw material. 2.5 million in Brazil. the car (90% of the car park) runs on motor fuel, which retains more or less ethanol. Ethanol plays an important role in the production of motor fuel in the United States, which is mainly produced from corn. The emergence of E 85 gasoline ethanol fuel (85% ethanol and 15% gasoline) in the market is due to the need to produce a new consistency of cars with a flexible fuel system. The following requirements apply to the vehicle: it must be in the appropriate fuel tank for both non-ethanol-containing gasoline and 100% alcohol-containing, and is subject to automatic adjustment and depending on the fuel content, respectively. fuel: must have a system that maintains the required ratio of air. The rubber hardware used must be resistant to alcohol and gasoline. The main obstacle to the use of ethanol in gasoline in Russia is the high cost of ethanol and its excise.

Gasoline (French-gasoline) is a mixture of variously structured hydrocarbons, a colorless liquid that boils at around 30-2050 C. Freezing point-600 C, ignition temperature below ^{0}C, density 700-780 kg / m3 (0.70-0.78 g / cm^2). Explosive compounds are formed when the concentration of gasoline vapors in the air reaches 74-123 g / m^3. Gasoline is mainly obtained by pumping oil and catalytic refining: less gasoline is obtained by refining coal and flammable shales (hydrogenation of destruction), as well as natural and by-products gases. Gasoline is mainly used as a fuel for internal combustion engines. About 10% of gasoline is used as a solvent, detergent and for other purposes.

CONCLUSION

In short, the biggest advantage of synthetic hydrocarbon-based fuels is their effect on the human body. That is, synthetic fuels do not have any negative effects on humans (which, of course, has yet to be proven). The fact is that the hydrocarbons themselves are very diverse, and in the language of chemists, they are linear, banded, cyclic, aromatic. Accordingly, although the types of hydrocarbons belonging to different groups have very similar fuel properties, their other physical properties, such as odor, viscosity, effects on the human body, are absolutely absent. differs. This is a very important aspect. If gasoline from oil gets into a person's stomach, it is clearly poisoned. Synthetic gasoline, on the other hand, is a neutral substance that does not contain any toxins, resins, or aromas, and therefore does not poison humans. This is a very important aspect. What is currently being done in this regard will improve humanity by creating a lighter lifestyle.

LIST OF USED LITERATURE

1. *Abidov B. Neft-gaz sintezi asoslari: o'quv qo'llanma/ B. Abidov, O.G'. Azimov, U.A. Ziyamuhamedova; O'zbekiston Respublikasi Oliy va o'rta maxsus ta'lim vazirligi: O'rta maxsus kasb-hunar ta'limi markazi. – Toshkent: «Faylasuflar» nashriyoti, 2013. – 176 b.*
2. *Мирзаев, С. С., Кодирова, Н. Д., Нуруллаев, М. М., & Хужжиев, М. Я. (2013). Изучение энергозатрат при плазмохимической диссоциации сероводорода. Молодой ученый, (2), 49-52.*
3. *Давронов, Ф. Ф. У., & Хужжиев, М. Я. (2018). Изучение процесса очистки газов физической абсорбцией. Вопросы науки и образования, (3 (15)).*
4. *Хужжиев, М. Я. (2018). Изучение методов конверсии метана в синтез-газ. Научный аспект, 7(4), 852-854.*
5. *Усанбоев, Ш. Х. У., & Хужжиев, М. Я. (2017). Основные свойства катализаторов гидроочистки. Вопросы науки и образования, (5 (6)).*
6. *Кобилов, А. Б. У., & Хужжиев, М. Я. (2017). Механизм поглощения H2S, CO2 и других сернистых компонентов водными растворами аминов. Вопросы науки и образования, (11 (12)).*
7. *Бурхонов, И. У., & Хужжиев, М. Я. (2017). Сравнительный анализ эффективности работы аппаратов воздушного и водяного*

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 6 | Issue: 11 |November 2020 || Journal DOI: 10.36713/epra2013 || SJIF Impact Factor: 7.032 ||ISI Value: 1.188

охлаждения нефтеперерабатывающих заводов.Вопросы науки и образования, (2 (3)).

8. *Ризаев, Д. Б., & Хужжиев, М. Я. (2017). Очистка газовых выбросов. Вопросы науки и образования, (5 (6)).*
9. *Хужжиев, М. Я. (2016). Очистка и осушка газов растворами гликолей. Наука и образование сегодня, (3), 33-34.*
10. *Хужжиев, М. Я. (2016). Изучение процесса риформинга и подготовки нефтепродукта. Наука и образование сегодня, (3 (4)).*
11. *Хужжиев, М. Я., & Хайдаров, Г. А. У. (2016). Изучение характеристики физических поглотителей для очистки газов.Наука и образование сегодня, (3 (4)).*
12. *Хужжиев, М. Я., & Нуралиев, С. С. У. (2016). Очистка газов водными растворами метилдиэтаноламина. Наука и образование сегодня, (3 (4)).*
13. *Хужжиев, М. Я. (2016). Материалы и реагенты для приготовления промывочных растворов в нефтехимической отрасли. Наука и образование сегодня, (3 (4)).*
14. *Сафаров, Б. Ж., Хожиев, А. Х., Хужжиев, М. Я., Ташпулатов, С. К., & Равшанов, М. М. (2016). Выбор режима разделения газожидкостных систем. Наука и образование сегодня, (3 (4)).*
15. *Хужжиев, М. Я., & Нуруллаева, З. В. (2015). Полимеризация газообразных углеводородов в жидкое топливо. Молодой ученый, (8), 332-334.*
16. *Nikolayevich, Tsukanov Maksim, and Khodzhiev Mamurzhon Yangiboevich. "ANALYSIS OF DEVELOPMENT OF TECHNOLOGY OF PRODUCTION OF SECONDARY PRODUCTS FROM PYROLYSIS DISTILLATE." EPRA International Journal of Multidisciplinary Research (IJMR): 246.*