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Compound of Coke and Gasoline with the Improved Ecological and Operational Characteristics

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ABSTRACT. In article is considered that results of the analysis new environmentally friendly and energetics of expedient technology of receiving a coke compound on the basis of bio vegetable and oil raw materials are presented to the present scientific and technological information. Results on receiving a coke compound with the minimum content of residual sulfurization connections are presented. The mechanism of a chemical method of purification of coke of residual sulfurization connections is shown.

KEYWORDS. Paper, wood, wood charcoal, cane, skin, petroleum coke, cotton boxes, rice pod, fragmented peat, from a cudgel, food waste, plastic, semi coke, rubber, straw, cotton stalks, textiles, black coal, ccompound briquettes.

I. INTRODUCTION

The modern economy consumes many renewable types of resources in such scales now that natural processes practically do not manage to restore them.

The scientific policy of the countries of the world is focused not on mitigation of consequences now, and on elimination of causes of infringement of ecological stability, i.e. for complex processing of traditional raw materials together with alternative and secondary resources providing, their interchangeability, on reorientation of production from some types of raw materials on others. The characteristic feature of development of world economy at the present stage is an increase in interests in use of alternative types of secondary raw materials as cheap source of production. In the developed countries of the world amplify an orientation on realization of complex processing of natural raw materials and secondary financially raw material resources together with implementation of technology providing their interchangeability now.



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II. SIGNIFICANCE OF THE SYSTEM

In article is considered that results of the analysis new environmentally friendly and energetics of expedient technology of receiving a coke compound on the basis of bio vegetable and oil raw materials are presented to the present scientific and technological information. The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion.

III. LITERATURE SURVEY

In these conditions reorganization of structure of use of resources, minimization of a share of non-renewable resources in a total amount of the processed consumed raw materials and energy resources due to attraction of renewable, including secondary and inexhaustible sources of raw materials and energy is relevant [1-2]. For branches of economy of the republic ecologic-operational indicators of oil coke not indifferently. It is known that at deep oil refining and its distillates one of the main processes is desulfurization process [3]. The sulfurization connections taking place as a part of organic structures form when burning oxides of sulfur, showing toxins for all elements of the environment. In too time because of technological difficulty of realization of process of catalytic hydrodesulphurization of heavy fractions of oil - tars and the vat remains without preliminary cleaning of sulfurization connections go for operation including on process of coking as the main raw materials [4].

IV. METHODOLOGY

Therefore, the connected sulfur, the regroupings taking place as a part of complex organic and hydrocarbon structure in the course of coking in connection with thermal pass into stapler form of sulfurization connections, almost not given by the known methods and technologies. In confirmation noted by us, the Uzbekneftgaz National Holding Company within the last 15 years does not remove from the agenda for priority of development of a method and technology from the subsequent realization of the developed process at the basic industrial enterprises. It is known that oil coke is used as reducer of oxides of iron with receiving chemical pure iron metal. It is known also technological capability of receiving iron restoration by charcoal on what is available production, ecological, technological, in general strategic need today. In too time of production of wood coal reducer in one country of the world it was not made for ensuring requirement of metallurgy. And the arisen situation forces productions of goods with use of modern technologies with the improved ecological and operational indicators. For the solution of an objective the scientific and production organizations address composite use of natural traditional and alternative raw material resources not seldom with attraction of secondary material raw material resources.

Development of technology of receiving composite coke with the improved ecological and operational indicators with use in quality a compound of raw materials of heavy fractions of oil together with wood materials that will provide decrease in concentration of sulfurization connections in end products, meeting those the requirements of existing rules, established to state standards on end products.

V. EXPERIMENTAL RESULTS

As wood material it will be possible to use the remains of one-suitable plants, in particular stalks of cotton of a stalks – cotton which potential is resumed annually in October-November of months not less than 50-60 million tons. In view of deficiency of timber in treeless regions of an arid zone of Central Asia the organization of production of environmentally friendly charcoal on material resources of the remains of one-suitable plants is a relevant task and has important economic, ecological, technological, power in general strategic importance for the Republic of Uzbekistan. Uzbekistan though is very rich on renewable natural resources as cotton stalks – cotton stalk, reed, straw, the riparian forest, stalks of rice, sunflower, products sanitary cutting of trees, annual plants which potential are estimated not less than several the tens of millions of tons their most part is burned on places the formed smoke screen worsens ecology of the next settlements that negatively affects health of the population.

In these conditions reorganization of structure of use of resources, minimization of a share of non-renewable resources in a total amount of the consumed raw materials and energy due to attraction of renewable and inexhaustible sources of raw materials and energy is relevant.

Table-1

Approximate values of the lowest heat of combustion of combustible solid materials and substitutes of fuel

No	Name of materials	Under most heat combustion, MDj/kg (kcal/kg)
1	Paper	16,62 (3970)
2	Briquettes: from coal from peat	<29,30 (7000) <17,58 (4200)
3	Wood($W^P < 10\%$)	<25,12 (6000)
4	Wood charcoal	27,25 (6510)
5	Cane($W^P \approx 10\%$)	1,46 (350)
6	Skin	45,22 (10800)
7	Petroleum coke	30,18 (7210)
8	Cotton boxes	14,29 (3415)
9	Flax shive	15,93 (3805)
10	Head of cabbage of corn dry ($W^P < 10\%$)	14,65 (3500)
11	Fragmented peat ($65\% \geq W^P$)	10,84 (2590)
12	Sunflower pod	15,43 (3685)
13	Rice pod	13,31 (3180)
14	From a cudgel	5,96 (1425)
15	Elimination of solid city waste	8,04 (1920)
16	Food waste	5,98 (1430)
17	Plastic	41,87 (~10000)
18	Semi coke	27,26 (6510)
19	Rubber	45,01 (10750)
20	Straw	15,70 (3750)
21	Cotton stalks (cotton stalk)	14,53 (3470)
22	Textiles	27,47 (6560)
23	Slag, coal ashes when burning in household furnaces	15,07 (3600)

Depending on a form and a condition of processing they can be more effective, environmentally friendly convenient and effective products in the operational relation. The developed new technology provides combined use of oil residues and certain geometrical fractions of stalks of a cotton in composition, providing meeting the requirements of modern performance standards of end products.

It should be noted that at pyrolysis of stalks cottons in analogy to technological processes of coking of oil residues up to 20% of masses. are formed pyro condensate, up to 17-19% of mass of initial raw material turn into mix of combustible gases and 35-37% of mass of the initial loaded raw materials remains in the reactor as pyro carbon – wood coke. The rest consists of water which half belongs to physical moisture of raw materials and the second half is a product of splitting of hydrocarbons. Therefore, at joint coking composite coking raw materials mixes, the gross output of pyro condensate increases that will naturally provide a coking gasoline exit – the most valuable energy carrier of the present – the main driving force of DVS. The fact that in mix of pyro condensate the oxygenate of the relevant fraction providing ecological and operational properties of commodity gasoline’s on account of full burning of fuels in DVS combustion chambers in the account availability of oxygen in mix take place draws still attention.

The scientific and technological novelty of the developed technology is that are for the first time applied pyro-lytic destruction of organic compounds of wood origin At dry heat treatment of a molecule of hydrocarbons are split in splinters and under certain optimal conditions technological process dehydrogenation proceeds and quantities of a target product - pyro carbon are formed maximum.

Modern methods of the analysis of process and the final product are executed. As it is already noted at pyro-lytic processing’s of residues of bio-plant materials it is possible will receive charcoal, briquetting of the last it is possible to receive carbon - hydrocarbon mix from strong consistence with the improved ecologic-operational characteristics.

Scientific and technological novelty of the direction is scientifically based attraction on the production turnover of renewable natural raw materials providing increase in gross output with the improved ecological and operational characteristics. Because, the receiving composite coke providing more active reducer with lower content of sulfur the quality of reducer is very important for assessment.

Heating capacity a compound of briquettes of reducers of metals from residues of bio plant materials and oil residues is more than at usual firewood and practically not less heating capacity of oil coke that has digital value not less than 5200 kcal/kg.

Table-2
Comparative characteristic on a heating value of briquettes

№	Name	kcal/kg
1	Tree (firm weight, damp)	2450 kcal/kg
2	Tree (firm weight dry)	2930 kcal/kg
3	Brown coal	3910 kcal/kg
4	Briquettes from a cotton stalk	4400 kcal/kg
5	Black coal	4900 kcal/kg

Eco logicity. A compound coke briquettes - an environmentally friendly product as by their production no additives are used. Positive aspect when using coke the compound of briquettes as reducers of metals is their minimum influence on the environment at combustion, in comparison with classical coke at an identical heating value as, for example, coal, but by 15 times the smaller content of ashes which fluctuate from 0.12 to 0.7% of masses.

Table-3
Comparative technical characteristics: on ashes content

№	Name materials	Materials %
1	Black coal	20% of ashes
2	Brown coal	40% of ashes
3	Compound briquettes	0,12% up to 0,70% of ashes

VI. CONCLUSION AND FUTURE WORK

The practical value of the developed technology is joint processing of the interfaced composite traditional and alternative raw material resources for receiving composite coke and the wide easy fraction of hydrocarbons (WEFH) with the improved ecologic-operational qualities that is – one of the most current problems of power, chemical technology, including metallurgy. Therefore the technology of receiving a coke compound with the improved ecological and operational indicators from composite raw materials of traditional hydrocarbon raw materials with wood bio-plant material with receiving a compound of coke and wide fraction of light hydrocarbons with the improved ecological and operational indicators not only is important but necessary.

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