НХК
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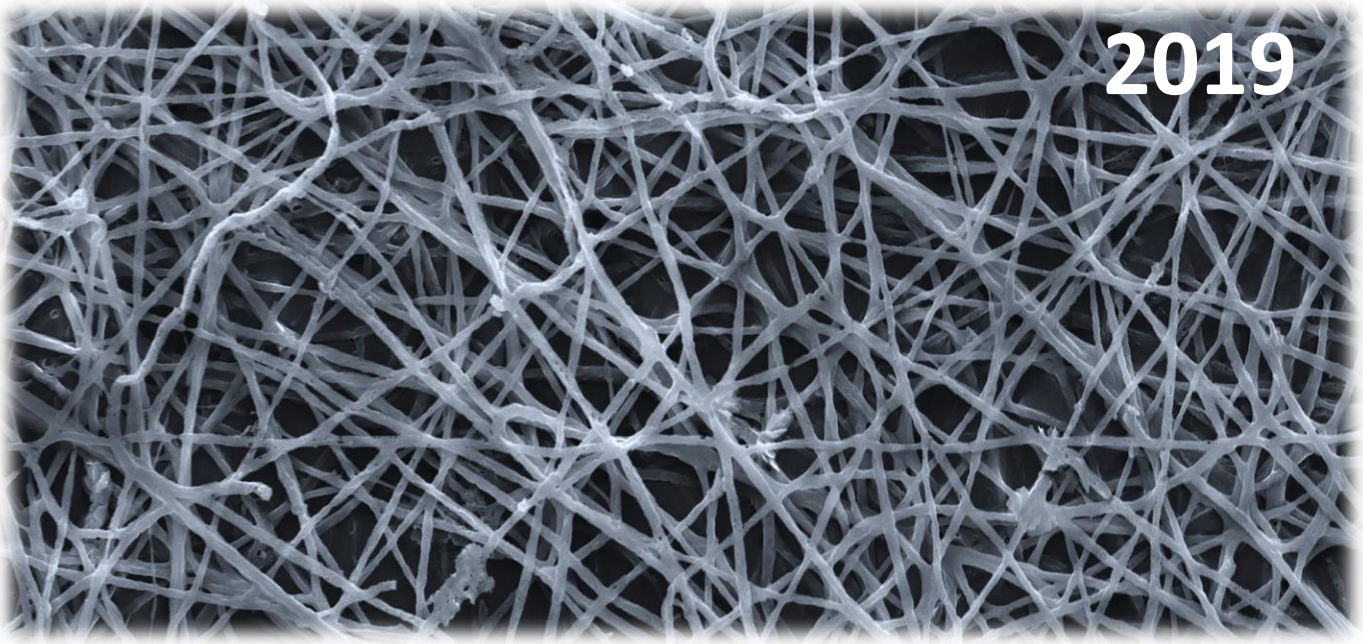
Ishimbay's petroleum carbon fibers plant (Republic of Bashkortostan)

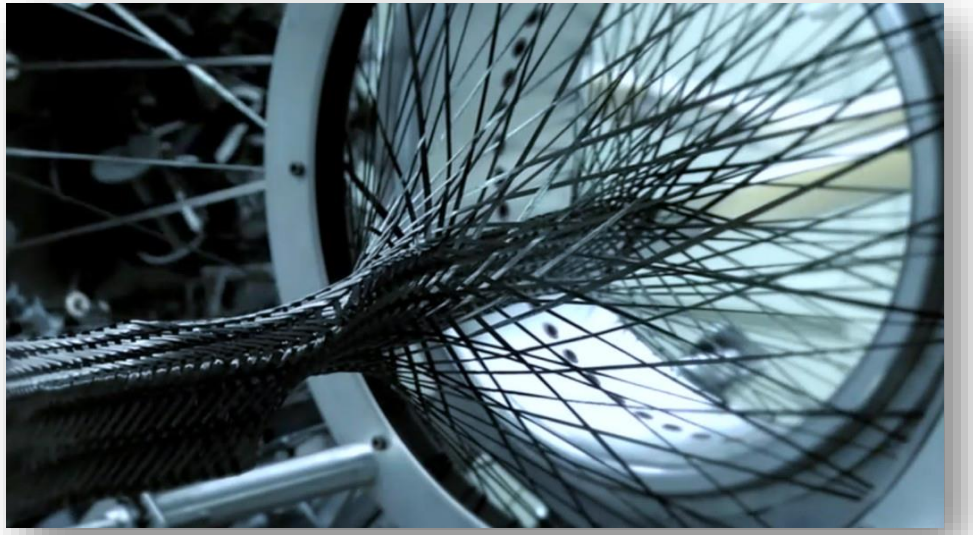
(up to 10 thousand tons of hydrocarbons per year)



The project is presented by a group of design, scientific and technical, petrochemical, service, installation and IT companies, as well as educational institutions of the Republic of Bashkortostan :

LLC «Neftechimkonsalt», LLC «Hammel», LLC «Mezhregiontreid», LLC «PT-Group», LLC «Orgneftechimproject»,
PC «Salavatneftemash»;
LLC «Konkrit», FSBEI «USOTU» Salavat city,
LLC «Severstroy».

Carbon fiber— nanostructured organic material containing 92.00-99.99% carbon and having high values of strength and modulus of elasticity.



In Russia at the moment there is no production of a full cycle (from oil products to fiber). Carbon fiber market value is an average of 10-100 Euros per 1 kg!

According to Smithers Apex forecast, the global carbon fiber market will reach 200 thousand tons by 2025 at an annual growth rate of 17%.

Properties of carbon fibers

material	Specific weight, g / cm3	Tensile strength, kg / mm2	Modulus of elasticity, g / mm2
Steel 45	7,81	60	20400
Steel 12X18H10T	7,90	55	20500
Aluminum D16T	2,78	43	7100
Fibreglass	1,9	50	2100
CFRP	1,5	95	14500

Compared to metals, plastics reduce the weight of the product in 3-4 times, reduction of energy intensity of manufacturing parts 5-8 times, increasing the need resource products by 1.5-5.0 times, improved corrosion resistance in 5-100 times!

Proposed technology

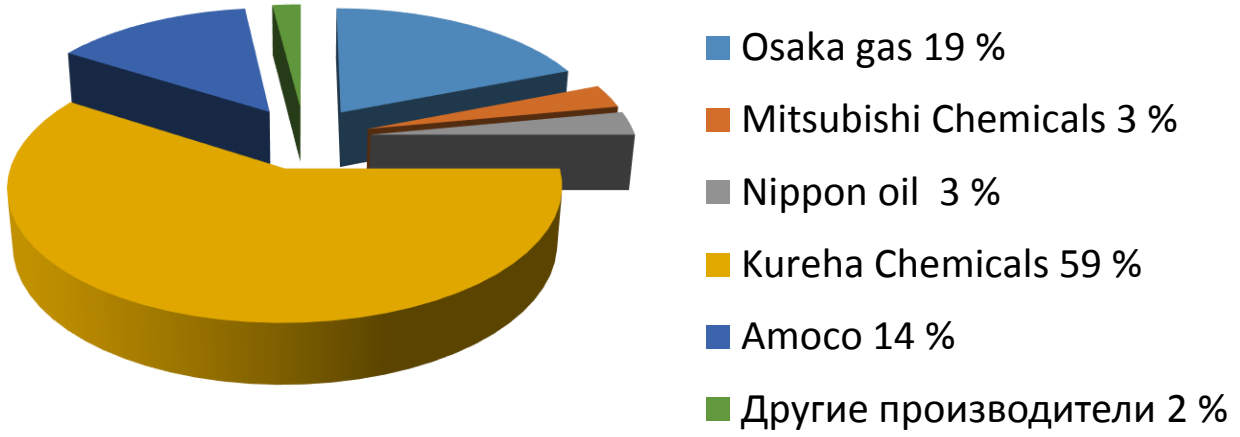
- The main advantage of our technology is the production of carbon fibers from petroleum raw materials.
- high-aromatized products of oil refining are used as raw materials.
- The resulting carbon fibers have a lower cost.
- This technology has no analogues in Russia.
- Analog of this technology is owned by companies in the United States and Japan, this technology is not sold or licensed.

Russian consumers of hydrocarbons

The maximum increase in consumption is planned in :

- alternative energy (wind turbine blades)– 30%;
- aerospace industry– 20% (the main consumers Boeing and Airbus);
- construction – 15%;
- production of sports equipment– 7%;
- the use of carbon fiber in the automobile and shipbuilding is expanding. In a few years, a mass transition to the use of carbon fiber body parts is expected.

World manufacturer hydrocarbons



Russian carbon fiber manufacturers

CC «Prepreg – Modern composite materials»
LLC «Prepreg-Dubna»
PC « Chemprominjeniring»
LLC «Argon»
LLC «CNV»
LLC «Carbon and composite materials plant»
LLC «Alabuga-fiber»
LLC «Composite -fiber»
LLC « Research center" Composite»

Technical features of the project

For the first time in Russia, the implementation of production "from petroleum products to carbon fibers" is proposed. The use of heavy pyrolysis residue and heavy FCC gasoil produced by Gazprom Neftekhim Salavat LLC was considered as raw materials.

Technological stages of production :

Raw material preparation

Removal of unwanted impurities by extraction of toluene insoluble components from raw materials, removal of water in the form of azeotrope and subsequent fine filtration.

Thermalizes

Heat treatment is carried out in the nitrogen current at relatively high temperatures (375-390 °C), under atmospheric or increased to 2.0 MPa pressures.

Stabilization

Heat treatment is carried out under vacuum (residual pressure 5-15 kPa at temperatures up to 340 °C).

Forming and processing

Melt, fiber extraction, oxidation and carbonation of the obtained fibers with further spinning. This type of fiber is commodity.

The project team has experience in producing carbon fibers in a complete scheme. Work has been carried out since 2009. Prototypes were obtained.

Material balance

The feasibility study of the project allows to make a choice in favor of the productivity of 10 thousand tons of hydrocarbons per year.

	%	thousand tons / year	tons / hour
Taken			
Heavy pyrolysis resin	50	34,91	4,36
FCC heavy gas oil	50	34,91	4,36
Total	100		
Received			
Thermal gases	12,8	8,90	1,11
Naphthalene fraction	25,0	17,46	2,18
Gasoline thermal	22,0	15,36	1,92
Baking gas oil	24,9	17,41	2,18
Carbon fiber	14,3	10,00	1,25
Loss	1,0	0,70	0,09

Project status for the current period

The project is supported by the Government of the Republic of Bashkortostan, a site for the implementation of the project in the special economic zone of the Ishimbay district of the Republic has been determined. There is a decision to include it in the list of priority projects of the Republic of Bashkortostan, which provides for the return of up to 30 % of the invested funds in the form of benefits, subsidies and refunds. The project was defended by the investment Committee under the Head of the Republic. Design estimates will be completed in the course of the investment project.

Economic indicators of the project

Project cost estimate in 2018 prices: 3.77 billion rubles.
Fiber capacity: 10 thousand tons per year.
Construction period: 2.7 years.
Demand for investments in 2018 prices: 3.77 billion rubles
Number of jobs (staff cap.): 200 units.
Sanitary zone: 0.6-1.0 km.
Output of the finished main product : 28.6%.
River water consumption : 10 м³/h.
Waste water consumption : 8 м³/h.
Electricity consumption : 4 MW.
Natural gas consumption : 125 м³/h.
The land area of 4-6 Hectares

Article	million rubles per year
Operating costs	462,8
Overhead and other expenses	310,0
Repair of equipment	242,5
The costs of raw materials	1640,9
*Sale of products	5984,9

* - at the cost of carbon fiber 7 € / kg.

Performance analysis

The carried out technical and economic calculation shows expediency of construction of production of carbon fiber to 10 thousand tons a year.

The annual economic effect of production is: 3.3 billion rubles.

Project payback period: 1.15 years.

Prospect of development

The planned production of carbon fiber can be increased to 20, and the production of pitch (precursor) to 30 thousand tons per year through the construction of the second and third production lines, with the organization of domestic sales of the precursor (Alabuga) and the expansion of the demand for finished fiber in Russia and China (in 2019, the deficit to 20 thousand tons per year).

Thanks for your attention!

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