be worse, but all the main peaks are shown on the X-ray diffraction pattern.

On comparison thermograms there is an exo-effect enhancement in the range of 800–850 °C indicating the incomplete xonotlite formation process under existing conditions that leads to wollastonite crystallization from synthesized components [2].

Based on the data we conclude that calcium silicate product synthesis should be carried out under 16 atm. with intensive grinding of raw materials. The received samples are characterized with higher density, respectively, with durability and heat conductivity. Upon heating up to 1000 °C the sizes and strength of the samples remain unchangeable.

Heat – resistant calcium silicate material obtaining based on local raw materials was studied. The samples, with significantly better characteristics than the materials produced in Russia, were received. Further technology development will allow us to produce ultralight materials with high structural characteristics.

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Development the logical algorithm for optimal gasoline blending

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Gasoline yield increases from year to year, while contemporary requirements on gasoline quality became more and more strict. The economic benefits of gasoline blending optimization are sufficient, but the task is challenging, due to factors such as:

- large number of involved feedstock streams,
- changes in the feedstock composition even for the same refiner ,
- non-linear nature of blending octane number,
- planning and scheduling difficulties

Such a difficult optimization problem requires highly specialized algorithms to be solved. In practice, applying mathematical models which consider observed problems is an effective solving method.

By the department of Chemical Technology of Fuel and Chemical cybernetics of National Research Tomsk Polytechnic University the complex modeling system for optimization of high-octane gasoline production was developed.

The basis of gasoline blending recipes calculations is the mathematical model that considers the influence of intermolecular interactions on the blending octane numbers. The module also calculates all required detonation characteristics of gasoline basing on hydrocarbon composition of streams:

- Aromatics, olefins hydrocarbons and benzene percentage
- Saturated vapor pressure (SVP), density and viscosity of gasoline.

The system is equipped with the logical algorithm that ensures optimal blending recipes development for gasoline which satisfies all required specifications, and produced with minimum cost. For this task, it utilizes an effective involvement of feedstock steams basing on their relative values. The blending process is realized as step-by step mixing of 12 main high-octane components. During this process, all gasoline quality parameters are strictly controlled. The scheme which highlights the main logical steps of the algorithm is provided in figure 1

As it can be seen from the scheme, mixing is performed starting from catalytic cracking gasoline as they may contain benzene and sulfur, and are represented in the greatest volume at the refinery; then reformate streams are

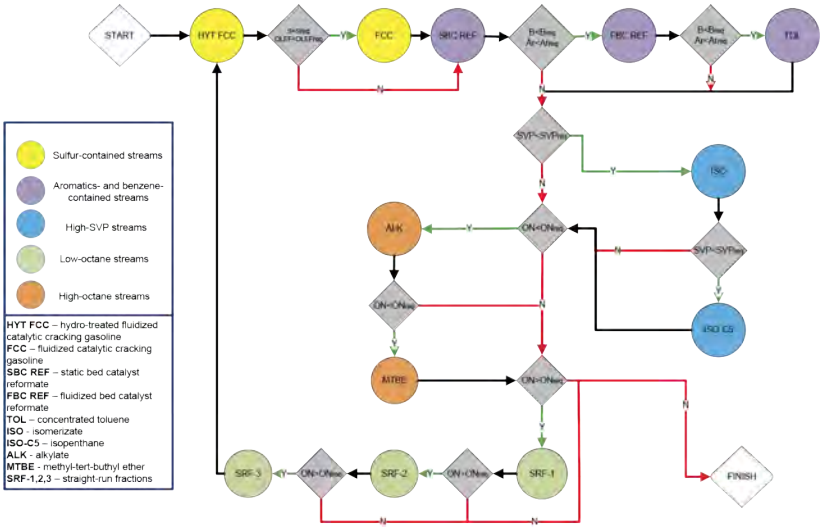

Fig. 1. *The scheme of the logical algorithm for gasoline blending*

added to achieve the maximum allowed percentage of benzene and aromatic hydrocarbons.

High-qualitative and the most expensive components such as isomerizate, alkylates and anti-knock additives are added to stabilize the RON and MON values, and straight-run fractions are added to stabilize the requested volume.

The algorithm is focused on solution of different technological goals:

- Production of requested volume of certain gasoline brand;
- Multiple gasoline brands production;
- Production of certain gasoline brand from already presented ones.

The calculation results for 1000 tones RON-95, Euro-5 gasoline brand are given in Table 1.

Table 1. RON-95 recipe and quality parameters

Stream	Mass, tones	Calculated recipe, tones	Stream	Mass, tones	Calculated recipe, tones
HYT FCC	200	200	SRF-2	200	0
FCC	200	150	SRF-3	200	0
SBC REF	200	200	**TOTAL**	**2400**	**1000**
FBC REF	200	44	**Calculated parameters**		
TOL	200	69	RON		95.05
ISO	200	200	SVP, kPa		51.32
ISO-C5	200	98	Benzene, % wt.		0.99
ALK	200	38	Sulfur, % wt.		0.001
MTBE	200	1	Aromatics, % wt.		34.99
SRF-1	200	0	Olefins, % wt.		8.94

As it could be concluded, the algorithm automatically develops an optimal recipe for selected brand and volume of gasoline, which satisfies all specifications, and firstly involves low-quality products, so that provides economy of expensive components, such as MTBE, alkylates, isopenthane.