In the hydrodewaxing process it is crucial to maintain the excess of hydrogen in circulating gas as fresh hydrogen injected simultaneously with the feed is intensively consumed in chemical reactions of hydrocracking. The hydrogen circulation rate is as higher as heavier the feed is and higher conversion degree is as well as lighter obtained products are. The hydrogen consumption rate significantly influences the exploitation expenses as well. For these reasons optimal hydrogen containing gas maintenance depending on the feedstock consumption is vital in order to achieve cost-effectiveness and resource efficiency of the plant.

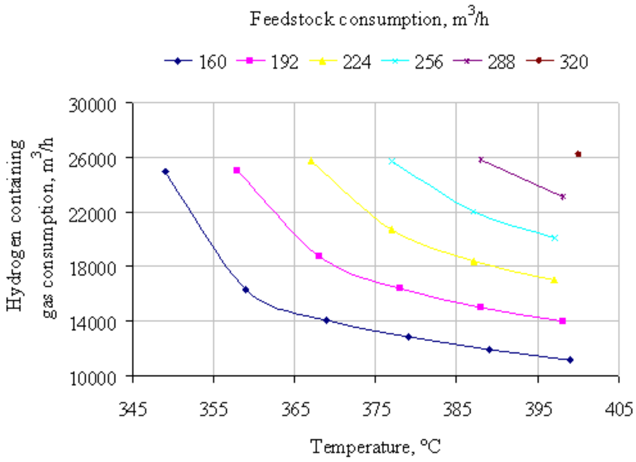

Fig. 3. The temperature and hydrogen containing gas consumption required to maintain n-paraffins C_{10}–C_{27} concentration at the level 9 wt. % depending on feedstock consumption

So, the higher the temperature in the reactor is the lower hydrogen containing gas consumption is required to obtain the product that meets desired low temperature properties.

The process should be operated at optimal ratio between temperature and hydrogen containing gas consumption depending on feedstock consumption to safe resource of the plant.

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HARDNESS SPREADING PARAMETERS FOR PIPELINE CONDITION ASSESSMENT

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Ensuring reliable and safe operation of pipelines is the most important task for oil and gas transportation companies. This is solved mainly by decreasing the corrosion damageability of pipes, however, pipeline failure is not only caused by corrosion.

During the pipeline operation, the metal of a pipe is experiencing degradation resulting from the accumulation of scattered damages of various origins, which form crack-type flaws. This causes deterioration of the performance of the pipe or its failure in terms of functioning parameters.

One of the most serious factors responsible for pipeline failures is irreversible changes in structure and physico-mechanical properties of the pipeline material under the action of various temperature and force effects, corrosion, aging, chemical interaction with the product being transported [1].

Clearly, the degradation distribution depends on the origin of the material, its structural state and operating conditions, as well as loading mode. Reliability of pipeline is defined by the current condition of metal and its mechanical properties (including tensile strength and yield strength).

Hardness measuring is widely used for pipeline condition assessment, since hardness value correlates, to a certain extent, with characteristics of all mechanical properties of a certain material. This method includes measuring hardness of several zones of a pipe and calculating a mean value, which is compared to original hardness value of nondeformed pipe. But, as stated by many authors [1-5], condition assessment of a material correlates better not with the absolute values of hardness but with the spreading parameters of a value.

Lebedev [2] uses the Weibull coefficient of homogeneity *m* given by the formula:

$$m = 0.4343 d_n \left[\frac{1}{n-1} \sum (\log H_i - \log H) \right]^{-1/2}, \quad (1)$$

where d_n - a parameter depending on the number of measurements *n;*

H_i - the value of hardness according to the results of the *i*th measurement;

log H - the mean of value of the logarithm of hardness according to the results of *n* measurements.

Hardness spreading parameter used by Muzyka [3] is *v* coefficient of variation given by the formula:

$$v = \frac{1}{H_{cp}} \left[\frac{1}{n-1} \sum_{i=1}^{n} (H_i - H_{\text{cp}}) \right]^{-1/2}, \quad (2)$$

where H_{cp} - the mean value of hardness.

Kuzbozhev [4] is using dispersion *S* and standard deviation *σ* as a spreading parameters given by the formulas:

$$S = \frac{\sum (H_i - H_{cp})^2}{n-1}, \quad (3)$$

$$\sigma = \sqrt{\frac{\sum (H_i - H_{cp})^2}{n-1}}, \quad (4)$$

All the mentioned hardness spreading parameters can be used for oil and gas pipelines condition assessment, since the strain of the metal causes changes in the hardness value. The higher values of *m, v, S* and *σ,* there corresponds a high level of scatter of the hardness parameters, a worse structure arrangement and, therefore, a higher level of damage.

And, on the contrary, lower values of *m, v, S* and *σ* represent a lower level of damaging.

Special experiments performed by Mihalev [5] have demonstrated that hardness spreading parameters also correlate with remaining strength of a material *T* and with stress cycle *N* given by formulas*:*

$$\mathrm{N} = \mathrm{N}_{\max} - 6 \times \mathrm{S}^2, \quad (5)$$

$$T = \frac{(S_d^2 - S_m^2) \times T_e}{S_m^2 - S_o^2}, \quad (6)$$

where N_{max} – maximum amount of stress cycles:

S_d – dispersion of destroyed specimen;

S_m – dispersion of actual specimen*;*

S_m – dispersion of original specimen*;*

T_e – operating time.

It was determined that cycle loading leads to proportional increase in dispersion of hardness value. All the destructed specimens are characterized by value of dispersion 2000-2500 HB [5].

It clearly stands out that derived characteristics of hardness value (in particular dispersion, standard deviation, Weibull coefficient of homogeneity and coefficient of variation) can be considered as more representative parameters for the estimation of mechanical properties and structural state of oil and gas pipelines. Possibility of determination of almost all the mechanical properties of pipeline's metal and not requiring its destruction, makes the hardness testing a promising method for pipeline condition assessment.

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SILICEOUS METASOMATISM IN GOLD DEPOSITS OF WESTERN UZBEKISTAN

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Gold deposit of western Uzbekistan are located in Kyzylkum desert and Nuratau mountain region and mainly belong to low-sulfide syndeformation/synigenous class of gold deposits formed in the brittle/ductile transition zone of the crust within transpressional shear zones [2] and mainly hosted in black shales, metasedimentary rocks: turbiditic siltstones, sandstones, limestone etc. has been considered as one the most important types of gold deposits of the world. All ore hosted rocks and wall rocks are altered, cut off by quartz veinlets.

Metasomatic rocks on ore deposits in Uzbekistan and neighboring regions engaged group of talented geologists: A.V.Korolev, V.A.Zharikov, A.B.Batalov, S.T.Badalov, R.A.Musin, M.I.Moiseeva, V.I.Reharsky, N.N.Koroleva, I.M.Mirhodzhaev, T.Z.Zakirov, V.A.Horvat, G.H.Klebley, V.F.Viktorov, I.M.Golovanov, A.M.Musaev and others. Relationship between granitoids and hydrothermal changes on the gold deposits was revealed by T.S.Shayakubov, T.N.Dalimov on Muruntau gold deposit example. [3] Some concealed granite bodies were revealed by drilling about 1 km southeast of Muruntau (“Murun granite”) and by exploration bore holes penetrating the Meso-Cenozoic platform cover about 15–25 km southeast and south-southeast from Muruntau (“Sardarin pluton” and “Kurukkuduk granite”).

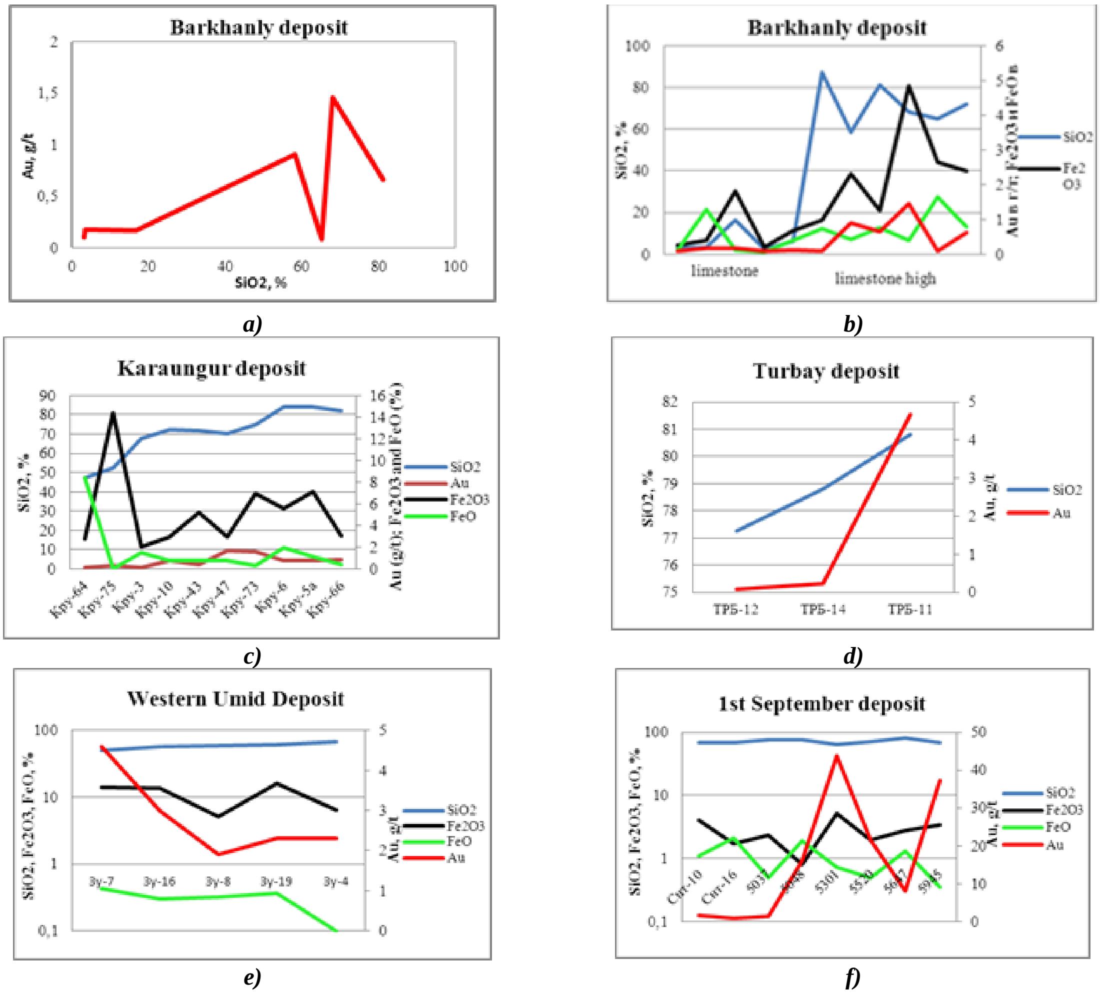

Fig. 1. The relationship between contains of Au, SiO2, Fe2O3 and FeO on individual areas