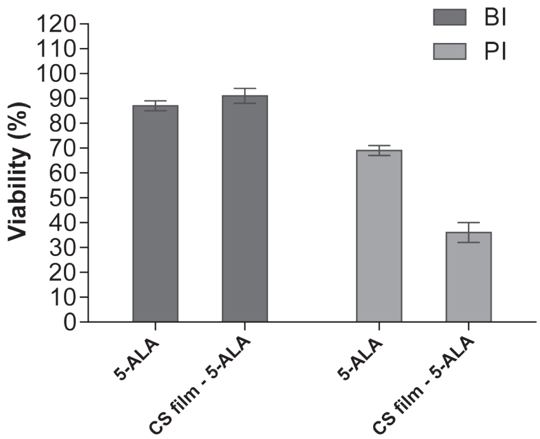

Fig. 3. *Cell viability before (BI) and after laser treatment*

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THE MODERNIZATION OF THE COLUMN CONDENSATE AND OIL STABILIZATION

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Enterprises of the oil and gas industry, like deposits on which they receive hydrocarbons, during their existence pass periods of development, prosperity and aging. The exploitation of enterprises in their period of development and prosperity is attractive for their owners. But, what to do with the enterprise, which is located on the deposit with a falling prey? Such enterprise has the equipment of high capacity, the competent personnel, and the developed infrastructure. Most owners try to reduce investments in such enterprises to a minimum, and maintain its work until it gives at least some profit.

But you can change the attitude to such the production, maked the technological process more flexible. This will allow to operate the equipment at different loading levels, to process more diverse the raw materials. Thus, it is possible to extend the life of the enterprise. Yes, the payback period will be longer than the owner would like.

How to do it? Let's consider this issue using the example of a condensate stabilization unit at the Orenburg gas processing plant, which was designed for high productivity and for processing only condensate. This plant is now subject to stabilization, not only condensate, but also oil, which causes certain technological problems.

The essential difference between oil and condensate, when stabilizing them, is a lower content of components of the raw material rising to the concentration part of the distillation column. This leads to the fact that the plates become "dry" and the efficiency of their work drastically decreases. To prevent a "dry" dish, operators increase the amount of reflex to flood the plates, or increase the temperature in the boiler, to create a larger vapor flow. To a certain extent, these actions allow improving the process of condensate or oil stabilization. But all this leads to an increased expenditure of energy.

It can be approached from the other side, it is possible to reduce the load on the concentration part by lowering the pressure in the stabilization column. For this we equip the unit with an additional compressor and heat exchanger. With decreasing pressure, the volume of rising vapors increases, and the throughput of the concentration part decreases. Only a change in thermodynamic conditions leads to a simultaneous decrease in temperature. Lowering the temperature in the column cube is favorable, the energy consumption is reduced, and the operating conditions of the heating equipment are improved. But lowering the temperature of the top of the column, leads to the fact that instead of an air-cooling device, you need to install, for example, a propane evaporator.

You can organize a refrigeration cycle by installing a compressor on the stabilization gas line. Compressing the stabilization gas, we expend energy, and the gas temperature becomes higher. If this stream is sent to a heat exchanger for heating the raw condensate, then it is possible to save energy costs and to abandon the air cooling apparatus. In our scheme, the stable condensate leaves the installation with a high temperature and an additional the recuperative heat exchanger could be installed. To create a low temperature at the top of the column, we organize an internal propane refrigeration cycle. The stream from the top of the column is sent to the new compressor, then it gives heat to the unstable condensate and is sent to the separator. After that, it is sent for mixing with the feed gas entering the enterprise, and later for further processing. The liquid from the separator is sent to the top of the column. It will also be necessary to install a control throttle in front of the column to relieve pressure. Once in the column, the liquid evaporates and cools the top of the column.

The developed model of the stabilization unit in the Aspen HYSYS program allowed to consider two variants of the stabilization column operation, during the processing of condensate and oil. Pressure, temperature regimes and loads are selected for efficient operation of the column and auxiliary equipment for oil stabilization. When implementing the proposed solution, you can extend the life of the company, save jobs, increase the economic attractiveness of Orenburg.

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INFLUENCE OF SUPPORT AND PREPARATION METHOD IN GOLD CATALYZED GLYCEROL OXIDATION

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Glycerol is a promising reagent because it is a major co-product of biodiesel production. Its conversion into valuable products is of upmost importance for biomass valorization and it is a polyfunctional material, which is very useful as a feedstock for fine chemical synthesis.

Catalysts containing supported gold nanoparticles are considered as the most favorable for liquid-phase glycerol oxidation. In gold catalysis, the nature of the support is known to be a crucial factor because gold nanoparticle performance strongly depends on their interaction with the support, which not only influences their size and morphology, but, a variety of other properties.

In the present paper a comparative study of gold supported on different metal oxides (Al_2O_3, MgO, $MgAl_2O_4$ spinel) in liquid phase oxidation of glycerol was implemented. For each support the influence of two preparation methods, namely deposition-precipitation with urea (DPU) and sol-immobilization (THPC-protected sol) was also investigated. The aim of this study was to highlight the influence of the precursor protective layer in mediating the support effect on catalytic activity and comparing $MgAl_2O_4$ spinel with individual oxide supports.

Catalysts were characterized by the following