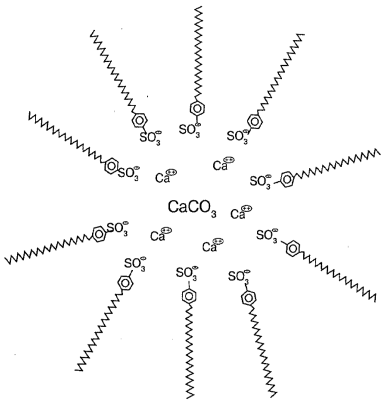

Fig. 2. Model structure overbased sulfonates

3. Ensuring the company's competitiveness in the long term.

4. Increase of profit by 60 %.

5. Solution to the problem of realization of by-products obtained during the process of sulfonate additives production.

6. Independence from the «Naftan» in terms of supply of raw materials for the sulfonation.

7. Will enable JV «LLK-Naftan» to become one of the largest producers of oil for modern engines of automotive technology in Eastern Europe.

Thus the transition to the synthetic base production of overbased sulfonate additives is economically and technologically practical.

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OUTLINE OF LOCAL ADDITIVES PRODUCTION PROBLEMS

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The article describes the actual problems of local additives manufacturing. Analysis of the lubricants quality is performed.

In order to satisfy the consumer needs in respect of car market production, today engineers are obliged to construct that sort of internal-combustion engines which will provide durable and good mechanism working under extremely severe conditions. However, perfection of engines construction leads to increasing of the load which present-day lubricants must withstand to satisfy the requirements of modern technique. Simultaneously the environmental aspect is considered which consists in the toughening of requirements imposed on the quality and composition of the lubricants produced. It is impossible to update the quality of marine, motor and gear oils without inserting of high-quality additives of different functionality in their composition for the reason that additives give the required functional properties to oils. Nevertheless, there are tendencies to reduce the content of additives in commercial oils and to increase its quality defined by the environmental requirements for the relevant products. In this way a difficult task is set before the manufacturers of additives, which includes the production of goods which will be competitive on the world market because of their high quality and at the same time will be characterized by low additives content.

One of the ways to improve the oils quality is to expand the range of additives. Unfortunately at present additives packages are formed and inserted into base oils only depending on their functional effects. However, the fact that the presence of several additives may cause changes in the intermolecular interactions of the solutions of additives in the oil as well as the solubility of additives in different base oils is not taken into account. Eventually all this factors lead to deterioration in the quality

of oils and to colloidal stability of oils with additives. Very often the sequence of inserting of the additives packages components and mixing modes are not taken into account. All this may result in the reduction of sedimentation stability of commercial oils under operating and storage conditions. Some portion of additives precipitates from the oil solution forming a precipitate on the surface of engine parts. Consequences of such phenomena are varied in the nature, for instance: deterioration of oils filtrability, filters clogging and others, in general deterioration of performance properties.

Therefore one of the ways to improve the quality of additives and their packages is to increase their colloidal stability. However it is necessary to improve production technologies in order to achieve the desired quality of additives. It includes optimization of dosage and the order of components inserting into the reaction mixture, organization of deeper and more perfect additives purification from mechanical impurities, selection of more effective solvents added at various stages of additives production technology, usage of high-tech methods to affect the colloidal state of additives dispersions in oil.

In order to maintain the colloidal stability in oil solution additives must be minimally subject to external factors that may change intermolecular interactions of additives in the volume of oil. Most of additives like detergent surfactants have hydrophilic and hydrophobic groups. Polar group (hydrophilic) determines the functional effect of additives and nonpolar group (hydrophobic) determines its solubility in the oil [1]. In this way nonpolar groups must provide the maximum possible solubility margin of the additive particularly in the process of the oil exploitation in the engine during which oil viscosity changes and accumulation of oxidation products leading to the additives association takes place.

Increasing of polarity of dispersion medium leads to decrease of oxidation products association, which accumulate in the process of oil exploitation and to increase of additive solubility in the oil solution which in its turn increases colloidal stability (fig. 1).

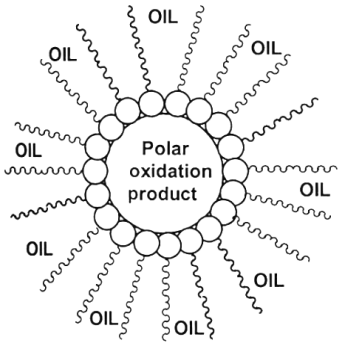

Fig. 1. Additive solubility in the oil solution

With increasing content of impurities the number of potential coagulation centers also increases which leads to integration of the additives particles and subsequent precipitation of them together with mechanical impurities particles in accordance with Stoke´s law.

With increasing content of coagulation centers additive particles adsorption from dispersion medium also increases owing to presence of uncompensated surface energy. Adsorption-desorption balance which takes place on the surface of coagulation centers stipulates particles growth. An increase of the number and of the size of particles leads to their more intense interaction, coagulation structures connection and as a result to the formation of coagulation carcass. This phenomenon is accompanied by surface tension changing at the interfacial surface and promotes gradual precipitation of dispersive phase out of dispersion medium. This phenomenon stipulates decline of additive package colloidal stability.

Additives perform three basic functions in oils, they restore oil properties which were lost or depressed during oil purification, improve original properties of the base oil and impart new properties to oil which it didn't possess originally. Additives belong to high-tech products which are characterized by the fact that their development costs are comparable with the costs their production development. Consumer properties of these products continuously increase therefore they have higher price on the world market than the price of other petrochemicals. Main foreign companies producing additives are Lubrizol, Exxon Chemicals, Chevron Chemicals, Texaco, Rohm and Haas, Shell and Infineum [2].

However financial crisis in 1998 has once again proved that orientation on imported additives packages is perspectiveless. Price for additives is increasing with the same rate as their consumption level. This negatively affects the price and realization of locally produced lubricants. Therefore much attention is to be paid to the quality improvement and diversification of locally produced additives.

One of the major tasks set before domestic additives manufacturers is to develop production of domestic antifoam, depressor, antioxidant and other high-quality additives the absence of which forces to focus on foreign market of additives.

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