of economic activities. According to the amount of irrevocable water losses, which are 10 % for industry, 10% for the needs of urban population, 60% for irrigation, and 70% for rural water supply, wastewater disposal is controlled by the water use for certain economic purposes and the corresponding amount of irrevocable water losses. The volume ratio of wastewater to water use characterises the specifics of the existing water consumption system in the basin. Calculation values of this ratio in percent can vary greatly. For example, in the basins with the predominantly developed agriculture, this value is approx. 4%, because the water use for irrigation and rural water supply are accompanied by significant water losses. In mine field areas, the ratio of the wastewater volume to the water consumption volume reaches 500 % and more. The excess of the wastewater volume in comparison to the water consumption is explained by the additional pumping of mine waters. The existing water consumption and wastewater disposal system determine conditions of functional and technogenic direction of the natural water transformation of many years.

The formation and transformation of the chemical composition of water under technogenic conditions reveals itself, first of all, in considerable amplitudes of hydrochemical water quality parameters both annually and in the long term. This reflects the main peculiarity of the interaction between industrial and agricultural wastewaters with natural waters: an abrupt change of the conditions of their formations and, therefore, a versatile manifestation and interchangeability of water quality parameters determine the methodological orientation in the research directed to detect interconnections with the functional organisation of natural and technical systems.

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SOME PROBLEMS OF ENVIRONMENTAL CHEMISTRY AND THEIR SOLUTIONS

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It is known that the increasing amount of CO_2 emissions of anthropogenic character leads to a disruption of the thermal balance of the Earth and is one of the reasons for the greenhouse effect. In our opinion, the future solution of the greenhouse effect problem consists in the return to the natural cycle of the element carbon in nature accompanied by the scientifically sound creative activity of the humanity. Creation of green planting with high photosynthetic properties will enable to utilize carbon dioxide by turning it into organic substances. This vegetative wood pulp will be both an energy source and a raw material for chemical industry. This man-made vegetation will also improve the climate and the look of the Earth. To solve this problem, it is necessary for the leading world powers to integrate.

However, it is necessary to save the environment today. For example, in the Belgorod region, in addition to a huge amount of CO_2 emissions, there are more than 6.5 tons of waste - citrogypsum - situated on the territory of the private corporation “Citrobel”. In the

laboratory of chemical technology of the Belgorod State National Research University we developed the technological fundamentals of the combined treatment process of citrogypsum and CO_2 emissions, at the end of which we obtain 2 useful chemical products, ammonium sulphate and nanostructural component fertilizer and calcium carbonate filler.

Feather waste from poultry factories in Belgorod also require utilization and treatment. In the laboratory of chemical technology we created a treatment technology which consists in the thermohydrolytic fission of keratic structures of the feather waste with the presence of inorganic bases. By adding to the obtained hydrolisate a minimal amount of sulphated polyglycol alkylphenol ethers and non-saturated aliphatic sulphonates, it is possible to successfully use such a low-cost composition as a foaming agent for foam-concrete structures.

A reduction of the environmental risk can be achieved by creating safe future technologies. Such approaches towards the environment of the future already exist. It is known that sulfonation and sulfation of organic substances is connected to the presence of gas emissions containing toxic SO_3 and SO_2. In order to neutralise them, it is necessary to use bulky and costly gas purification systems. We have developed a direct-flow many-step technology and an equipment design of the sulfonation process of organic substances by a gaseous SO_3. With this simple technology, the formed gas emissions are of no environmental danger and costly purification facilities are not needed at all. The only necessary thing is a light afterpurification with the help of filters from polyvinylchloride material and mylar felt.

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ENVIRONMENTAL ASPECTS OF THE CLAY USE IN INDUSTRIAL AND AGRICULTURAL PRODUCTION

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In the course of the last 10 years the scientists from the Chair of General Chemistry of the Belgorod State National Research University have been carrying out an active research in the development of efficient sorbents on the base of native montmorillonite clays in the region in order to purify natural and industrial waters.

Experimental sorbents obtained by means of enrichment and modification of the natural clay (its acidic, alkaline and salt treatment) are not worse, and, in some cases, are even better than the traditionally applied sorbents such as charcoal and activated charcoal for the purification of water from heavy metal ions (lead, cadmium, copper, chrome, iron etc.), oil products and fats.

The suggested technological solutions of the implementation of the sorbents mentioned above have been successfully tested in municipal and industrial water treatment facilities.

We also obtained encouraging results in the purification of water from radionuclides Caesium-137 and Strontium-90, the content of which has been monitored on the