

OZONE LAYER DESTRUCTION: PROBLEM SOLUTION**A.V. Yagnitsina**Scientific advisor associate professor I. A. Matveenko
National Research Tomsk Polytechnic University, Tomsk, Russia

The ozone layer is a layer of air in the upper atmosphere with the highest ozone content formed as a result of ultraviolet solar radiation impact on molecular oxygen (O_2). The molecule of ozone consists of three atoms of oxygen. The ozone layer is located at an altitude of 25-30 km in tropical latitudes, moderate – 20-25, in the polar – 15-20. The ozone layer of the atmosphere is very thin. It protects life on the Earth from a pernicious ultraviolet light of the Sun.

The aim of the study is to examine the literature on the problem of ozone depletion, to learn the proposed ways of solving this problem, summing up the methods of ozone layer protection. In accordance with the purpose of research there are the following tasks: to study the literature and other sources on the subject, select the appropriate information, analyze the selected information to draw a conclusion on the selected information.

Scientists learned about an ozone layer of the atmosphere in the 1970's. It was discovered that derivatives of chlorofluorocarbon (cryofluorane 14) (the compound which is applied in refrigerators, air conditioners and aerosol cans) can destroy ozone. Under the influence of solar radiation cryofluorane 14, rising in the upper atmosphere, forms chlorine which splits ozone.

The ozone layer is also destroyed by jet aircraft and launching space rockets. The fuel "burns out" big holes in the ozone layer, and the airplanes which, especially flying at great height, throw out the substances perniciously influencing a status of an ozone layer.

The human activities leading to destruction of the ozone layer are of the greatest concern.

In 1985, English scientists found huge "hole" in the ozone layer over Antarctica. The ozone hole is a local drop in the concentration of ozone in the ozone layer of the Earth. Depletion of the ozone layer contributes to the intensive penetration of solar radiation to the Earth and causes some cancer formations of human skin. Besides, elevated radiation leads to a sharp increase in the mortality rate among the marine animals and plants. Moreover, depletion of ozone layer can result in unpredictable change of climate on the Earth. The ozone layer prevents heat from dissipating over the Earth surface. In the course of reducing the amount of ozone in the atmosphere air temperature decreases, the direction of the dominating winds changes and weather changes. Droughts, crop failures, shortage of food and, as a result, hunger can be among the consequences of ozone layer depletion. Some scientists estimate that even if measures are taken and all productions resulting in destruction of the ozone layer stop, then it will take about 100 years to restore it in its entirety.

On September 16, 1987 representatives of twenty-four countries met in Montreal and signed the agreement under which cutting the use of ozone-depleting CFC by half was to be undertaken by 1999. However, due to worsening conditions in 1990 in London amendments to the Montreal protocol was signed up according to which the list of adjustable CFC included ten substances more were adopted. Since then the protocol was exposed to revising seven times in 1990 (London), 1991 (Nairobi), 1992 (Copenhagen), 1993 (Bangkok), 1995 (Vienna), 1997 (Montreal) and 1999 (Beijing).

Thanks to signing of the Montreal protocol, corrections and adjustments to it, as well as the measures for the decrease in output of ozone-depleting substances by 2005 the volume of world annual production and consumption of these substances was reduced by

95% as compared to the level of 1989. The total amount of the ozone-depleting substances and their substitutes released into the atmosphere for this period was reduced by 81.1%. Since the documents came into force, the concentration of ozone-depleting substances in the atmosphere began to decline. The systematic failure from ozone-depleting substances had the positive effect on global climate, most of these substances being significant greenhouse gases.

On September 16, 1994 the General Assembly proclaimed the protection of the ozone layer in the memory of that day in 1987, when the Montreal protocol was signed. The states were offered to devote this Day to promotion of activities according to the tasks of the Protocol and its corrections.

Saving the ozone layer as well as the whole planet is a matter of every person. Buying the air conditioner or refrigerator, much attention should be paid to how a compressor works. By 2010, Freon R22 had been banned in many countries. Therefore, buying an outdated technology, you will certainly do harm to the atmosphere. Our task is to minimize the use of chemicals in sprays such as deodorants, hair sprays, air fresheners, polishes, etc.

It is no secret that one of the main pollutants are vehicle exhaust. Limit your drives on private cars, preferring the public transport or, even better, bikes.

Green plantings enrich air with oxygen and hinder depletion of the ozone layer. Therefore, it is necessary to participate in planting our cities.

In addition, one needs to reduce amount of wastes because their processing will do irreparable harm to the atmosphere. Therefore, it is appropriate to use environmentally friendly bags, refuse from polyethylene in our everyday life. One of the ways of contributing to ozone layer preservation is using the water filters, having refused from bottled water.

References

1. Baird, Colin. Environmental Chemistry / C. Baird, M. Cann. 5th ed. – New York: W. H. Freeman and Company, 2012. – 818 p.: il. – Index: p. 785-818.
2. Demchigzhav, Munkhabat. The problem of ozone layer in the world and in Mongolia [Electronic resource] / M. Demchigzhav // Scientific initiative of foreign students and post-graduates in Russian universities: proceedings of the VI All-Russian scientific-practical conference, Tomsk, 24-26 April, 2013: in 2 vols. – 2013. – V. 1. – P. 56-58.

ECOLOGICAL PROBLEMS IN PETROLEUM ENGINEERING AND INDUSTRY

V.S. Yassenko

Scientific advisor associate professor R.N. Abramova
National Research Tomsk Polytechnic University, Tomsk, Russia

The environmental impact of petroleum is often negative because it is toxic to almost all forms of life. When people began the exploitation of oil and gas fields, they did not think about the consequences of intensive extraction of these natural resources. A use of oil and gas as fuel hides a lot of danger. These products during burning emit carbon dioxide, nitrogen oxide, etc. Reducing the amount of oxygen in the atmosphere and increasing the number of carbon dioxide influences the climate.