

**SCI-CONF.COM.UA**

# **PROGRESSIVE RESEARCH IN THE MODERN WORLD**



**PROCEEDINGS OF V INTERNATIONAL  
SCIENTIFIC AND PRACTICAL CONFERENCE  
FEBRUARY 1-3, 2023**

**BOSTON  
2023**

# **PROGRESSIVE RESEARCH IN THE MODERN WORLD**

Proceedings of V International Scientific and Practical Conference

Boston, USA

1-3 February 2023

**Boston, USA**

**2023**

# AGRICULTURAL SCIENCES

## HYDROGEN AS AN ALTERNATIVE TYPE OF FUEL

**Iesipov Oleksandr**

Candidate of Technical Science

Associate professor

**Bondar Vitalii**

is a master's student

State Biotechnological University

Prospekt Heroiv Kharkov

45, Kharkiv, Ukraine

**Annotation.** The transfer of road transport to alternative fuel, in particular hydrogen, provides a fundamentally new approach to saving raw resources, and will also contribute to the elimination of toxic emissions. In the future, hydrogen will become part of the solution to the problem of environmental pollution. And the prospect of this type of fuel and hydrogen cars will begin to become clearer in the coming years with the appearance of the first mass-produced cars on the roads.

**Keywords.** Road transport, alternative fuel, raw materials, hydrogen, carbon dioxide, hydrogen cars.

Today's cars contribute to smog, air pollution, acid rain, and the greenhouse effect. Therefore, reducing emissions is a very urgent problem that can be solved.

The transfer of road transport to alternative fuel, in particular hydrogen, provides a fundamentally new approach to saving raw resources, and will also contribute to the elimination of toxic emissions.

But the main problem is that there are a number of difficulties in the industrial production of hydrogen-based fuel. To split water into hydrogen and oxygen, catalysts are used, which include platinum, and which are too expensive to be

considered from the point of view of meeting all of humanity's energy needs. Obtaining hydrogen by the electrolysis method is inefficient from an energy point of view, the amount of energy spent on it significantly exceeds the amount of energy contained in hydrogen. The process of obtaining hydrogen from fossil fuels produces a large amount of carbon dioxide, which is released into the atmosphere, which negates all the "green" potential of the further use of hydrogen as a fuel. However, it is too early to discount hydrogen due to the fact that many groups of scientists and researchers are searching for new efficient methods of obtaining hydrogen.

In recent years, interest in research devoted to the problems of using hydrogen as an alternative fuel has been growing rapidly in the world's leading scientific centers. Many studies have been conducted in research centers in Germany. The work carried out in Japan, which investigates the use of gaseous and liquid hydrogen, as well as additives of this fuel to the fuel-air mixture, is widely known [1, 2]. Similar studies were conducted in Norway, Poland, France, Australia, India, etc.

**The main reasons that dictate the need to switch to alternative energy sources as soon as possible are as follows:**

— ecological: traditional energy-generating technologies have a detrimental effect on the environment, their further use inevitably leads to catastrophic climate changes;

— economic: the cost of energy from alternative sources is much lower than that produced by traditional energy-generating technologies;

— social: the number and density of the population is constantly growing, so it is increasingly difficult to find places for the construction of nuclear, thermal power plants, hydroelectric power stations, where energy production would be profitable and safe not only for people, but also for the natural environment. The social needs of society for fuel alone exceed the biological needs of the population for food by 40 times and are higher than the annual accumulation of energy in biomass, and this requires a radical change in the state's energy policy;

— evolutionary-historical: due to the limited fuel resources on the planet and the growth of catastrophic changes in the biosphere, traditional energy has reached a

dead end, for the further evolutionary development of the human community, a gradual transition to alternative energy sources is necessary; — political: the country that will be the first to fully master alternative energy can claim world leadership and actually dictate prices for fuel resources and technologies.

The International Energy Association predicts that by 2030, global biofuel production will increase to 150 million tons of energy equivalent of oil. Annual production growth rates will be 7–9%. As a result, by 2030, the share of biofuel in the total volume of fuel in the world's transport sector will reach 4–6% [3].

In the future, hydrogen will become part of the solution to the problem of environmental pollution. And the prospect of this type of fuel and hydrogen cars will begin to become clearer in the coming years with the appearance of the first mass-produced cars on the roads.

## REFERENCES

1. Shy, S. S., Lin, W. J., and Wei, J. C., «An Experimental Correlation of Turbulent Burning Velocities for Premixed Turbulent Methane-Air Combustion», Proc. R. Soc. Lond. A, Vol. 456, pp. 1997–2019.

2. Swain, M. R., Yusuf, M. J., Dulger, Z., and Swain, M. N., «The Effect of Hydrogen Addition on Natural Gas Engine Operation», SAE Paper 932275, pp 1592-1600.

3. Yesipov O.V., Poliashenko S.O., Manoilo V.M., Isagulov B.D., Zhornyak M.V. The potential of biogas and biomethane from organic livestock waste. Technical service of agro-industrial, forestry and transport complexes. No. 24, 2021, pp. 16–23