

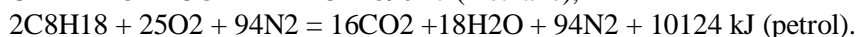
USE OF RESIDUAL HEAT AND CHEMICAL ENERGY OF EXHAUST GASES

P.U. Tkach, *group GM – 71*

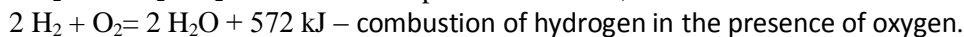
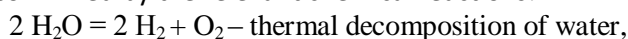
It is known that the exhaust gases consist of the following elements: nitrogen, oxygen, water vapor, carbon oxides, hydrocarbons, aldehydes, nitrogen oxides, soot, benzopyren.

Fuel combustion efficiency is far from the maximum value and a significant portion of this energy (about 25%) is not used but thrown away into the environment as exhaust gases. So we decided to analyze the use of exhaust gas as additional fuel, i.e. try to restore some lost energy and thereby increase the efficiency of internal combustion engines.

From the number of products that make up the exhaust gases we can immediately select the already mentioned fuel gas CO, and also the following gases – carbon and hydrocarbons, which can provide the growth of efficiency at the secondary use. But our work will concentrate on another product of the exhaust gases, namely on water vapor. Its existence in the exhaust gases is an indisputable fact and is confirmed by the relevant chemical reactions of fuel combustion:

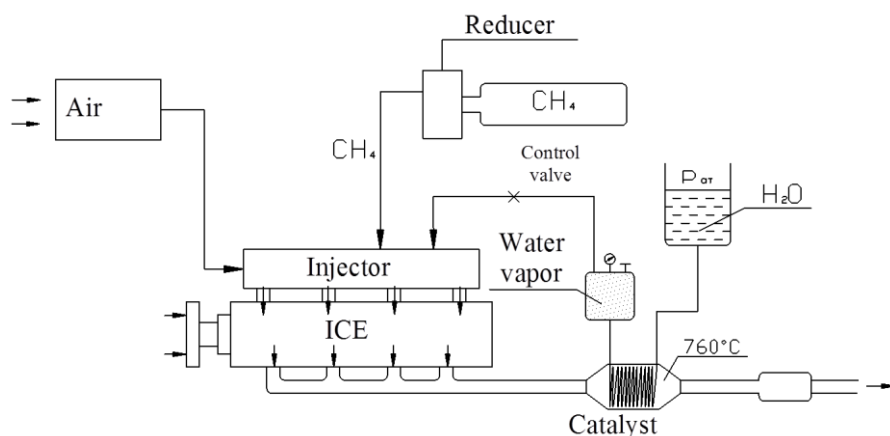


To use water as fuel we should create conditions under which a water molecule will decompose into oxygen and hydrogen. The elements that we will get can be used for combustion in the working chamber. This is confirmed by the relevant chemical reactions:



Now we see that the use of water as additional fuel is really possible without the use of an electrolytic method.

As you know, the exhaust gases leave the combustion chamber at temperature in the catalytic converter more than 700 °C. Clearly, this temperature is sufficient to convert water into steam, which can be sent to the working chamber for the decomposition into oxygen and hydrogen. We think that our ideas can be put into practice.



Therefore, we propose a scheme of how to use water vapor as an auxiliary fuel, for example internal combustion for a car, image in Figure 1.

Fig. 1 – model upgraded internal combustion

The idea is that we add water vapor to the combustion chamber of combustion engines. This pair is obtained when the water

passes from the tank through a special catalyst in the exhaust tract, where the temperature is high enough to turn the water into steam. Then it gets into the steam tank with gauge set and a special safety valve high pressure.

The control valve is installed between the tank and the steam injector that helps us control the flow of steam. Initially, this valve will be blocked and ICE operates in its normal mode. Then we open the control valve and the water vapor gets to the injector with air and fuel (methane), where working fluid is being prepared for the combustion chamber. There the molecules of water will separate into hydrogen and oxygen, which will change the composition of the fuel and make it complete combustion.

This simple revision of our forecasts for internal combustion should significantly improve engine efficiency and reduce harmful emissions.

I.A. Kovalev, *Ph.D, Professor*
S.V. Mikhno, *ELA*