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Ecology of coherent motor fuel *

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All types of modern transport cause great damage to the biosphere, but the most road transport is dangerous for her. In the global balance of pollution atmosphere, the share of vehicles is 13.3%, but in cities it rises to 80%.

Diesel engines are increasingly being used in the automotive industry. Them advantages: higher efficiency (up to 35%), the ability to work at more cheap fuel, however, due to the soot contained in the exhaust gases, difficult cyclic and aromatic hydrocarbons classified as carcinogenic substances, diesel engines are more toxic.

American and Swedish scientists have found that diesel exhaust gases disrupt the functioning of the immune system, significantly increase the risk of lung cancer.

Hydrocarbons in exhaust gases are composed of original or decayed molecules fuels that did not take part in combustion. Emissions are of particular importance benzene, toluene, polycyclic aromatic hydrocarbons and primarily benzo (a) pyrene. All of them belong to the group of carcinogenic substances, are not removed from the human body, and over time, accumulating in it, contribute to the formation malignant tumors.

World car manufacturers, periodically spurred by European legislators, America and Asia, have long been fighting to reduce the toxicity of waste gases. There are a lot of ideas, but all promising developments boil down to three technologies - "fuel cells" (Fuel Cell - see "ABS" N2 / 1997), electric motors and hybrid

engines.

Researchers for the most part seek to influence combustion processes changes in the chemical nature of the fuel and change the amount of free radicals and their energy state [2].

Combustion is one of the most complex phenomena known to man. Scientifically vision, combustion is a chain reaction of the successive fragmentation of fuel particles into all smaller charged radicals, these are also physicochemical processes transformation of the chemical energy of intermolecular bonds, these are physical processes of converting energy at the molecular and atomic levels, into heat and light, and many other processes occurring simultaneously.

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The work performed as a result of the combustion of motor fuel is carried out in the form

and the current job is like

Since the first term on the right-hand side of equation (2) represents that part of the inner energy that does not go into work, we write

When engine fuel is burned, energy is released

where Q is the calorific value of the fuel, m is the mass of the combusted fuel, E_a is the activation energy, k - Boltzmann's constant, T - temperature.

As you can see, the lower the activation energy of the fuel, the higher the current work in an isothermal process.

Let us consider the possibility of changing the activation energy of the nomenclature motor fuel. The activation of its molecules can take place as a result of the transition of atoms, included in their composition, to increased vibrational levels or as a result excitation of electrons. Activation can be triggered by absorption electromagnetic oscillations in the part of the visible spectrum; electric discharge;

magnetic field; ultrasound; rupture of valence bonds.

Collective nonequilibrium (coherent)
states when at one quantum level characterizing one of the
natural frequencies of oscillations of the material environment, is built up to the maximum possible number of spins.

In this case, E_a / kT decreases not only due to an increase in T, but also due to decrease in entropy, since $E_a / kT = S_a$.

One of the methods for achieving a coherent state of motor fuels is based on using a spin field.

The spin field, interacting with the spins of the material medium, transfers it from equilibrium to nonequilibrium state. However, until now there has not been the question of keeping the nonequilibrium state corresponding to natural frequency of oscillations of the material environment. For this purpose, a a method of providing such retention, carried out according to the following scheme (fig. 1).

Fig. 1.1 - spin generator, 2 - resonator of spin states, 3 - chip translator,
4 - car tank with fuel, 5 - chip inductor

A chip inductor 5 is placed in the tank of a car 4, which, through a quantum communication channel, created using the physics of entangled quantum states (the physics of entangled quantum states), associated with the translator chip 3. The translator chip is located in the resonator of spin states 2, to which the torsion generator (TG) 1. After switching on TG 1, the resonator is excited spin states 2 to the required level. Simultaneously with arousal the resonator, the chip translator 3 is excited, which, due to the effect entangled quantum states translates spin excitation

to the chip inductor 5. The chip inductor performs spin pumping of fuel in the tank 4 and transforms it into a continuously held spin coherent state.

Research on the influence of the spin coherent state of diesel fuel on the composition of the exhaust gases was carried out on the test bench of the Laboratory internal combustion engines of the Poznan Polytechnic Institute.
Bench engine parameters are shown in Table 1.

Table 1. Parameters of the used motor

Engine type	Andoria 4TC90 Turbo Diesel
Maximum power [kW / KM]	66/90 at 4100 rpm
Maximum torque [Nm]	195 at 2500 rpm
Diameter / piston stroke [mm]	90/95
Engine displacement [cm $_3$]	2417
Compression ratio	21.1: 1
Ignition sequence	1-3-4-2
Direction of turns	Left
Fuel pump	Private
Speed regulator	Mechanical
Engine cooling	Flowing
Fuel	Diesel according to PN-EN 590: 1999
Autol	Lotos Diesel API CG-4 / SH SAE 15W / 40
Climatic parameters of the room	T = 26.5 $_0$ C, p = 1004 hPa

Results of studies of the influence of the spin coherent state of diesel fuel for the composition of exhaust gases are given in table 2.

Table 2. Measurement results

No. p / p	**n, l / min**	**Ne, kW**	**Mo, Nm**	**G $_e$, G / s**	**g $_e$, G / kWh**	**C, mg / m $_3$**	**CxHy, mg / m $_3$**	**PM, mg / m $_3$**
Equilibrium state of diesel fuel								

1a	**2500**	**-**	**-**	**0.27**	**-**	**2.6**	**182**	**72**
2a	**2500**	**5.18**	**19.3**	**0.95**	**660**	**3.5**	**103**	**40**
3a	**2500**	**12.43**	**47.5**	**1.33**	**385**	**5.4**	**133**	**53**
4a	**2500**	**24.62**	**195**	**2.07**	**302**	**7.2**	**60**	**26**
Coherent state of diesel fuel								
1b	**2500**	**-**	**-**	**0.25**	**-**	**0.3**	**96**	**34**
2b	**2500**	**5.10**	**19.0**	**0.94**	**653**	**0.9**	**70**	**24**
3b	**2500**	**12.43**	**47.5**	**1.36**	**393**	**2,3**	**94**	**35**
4b	**2500**	**24.62**	**190**	**2.16**	**315**	**3.3**	**33**	**13**
Percentage change *								

1s	**-**	**-**	**-**	**-7.40**	**-**	**-88.46**	**-47.25**	**-52.77**
2c	**-**	**-**	**-**	**-1.05**	**-1.06**	**-74.28**	**-32.03**	**-40.00**
3c	**-**	**-**	**-**	**2.25**	**2.07**	**-57.40**	**-29.32**	**-33.96**
4c	**-**	**-**	**-**	**4.34**	**4.30**	**-54.16**	**-45.00**	**-50.00**

- the minus sign indicates a percentage decrease in emission products

Using the data in Table 2, a graph is built, shown in Fig. 2, reducing the content of soot (C), hydrocarbons (CxHy) and particulate matter (PM) [%] in exhaust gases of burnt coherent diesel fuel at different engine torque [Nm] in a relatively equilibrium (incoherent) diesel fuel.

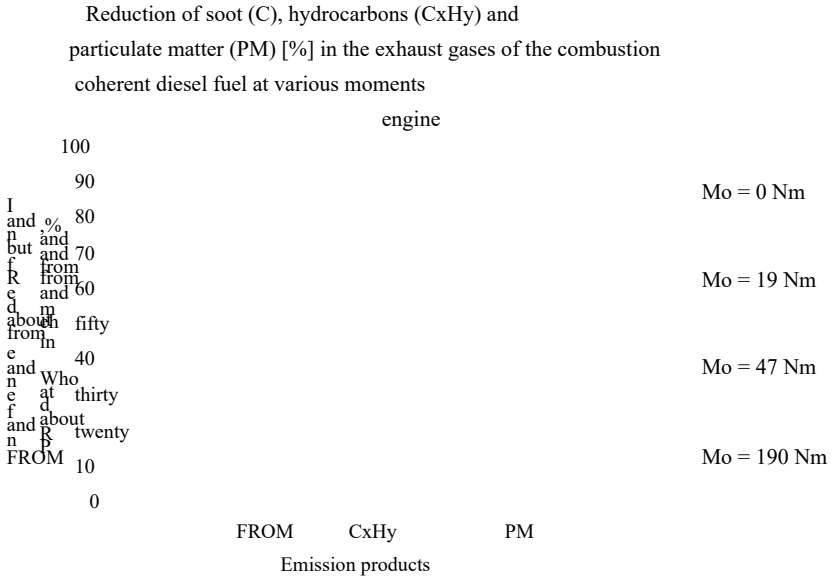

Fig. 2.

The same stand was used to study the influence of spin coherent condition of diesel fuel for composition of exhaust gases in accordance with tests ECE R-49 and Euro II. As a result of the statistical analysis of this complex studies plotted graphs shown in Fig. 3 and 4, reduction content of soot (C), hydrocarbons (CxHy) and particulate matter (PM) [%] in waste gases of burning diesel fuel. At the same time, for 100% are taken figures adopted in the ECE R-49 and Euro II tests.

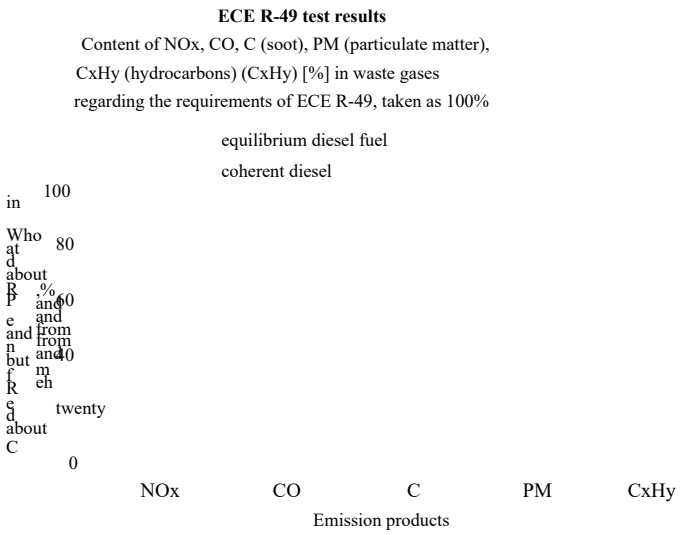

Fig. 3.

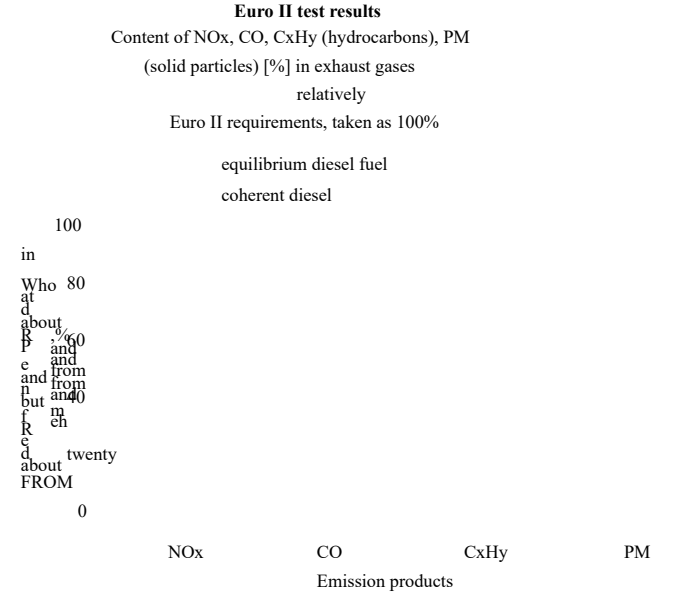

Fig. four.

As a result of the research carried out, the following conclusions can be drawn:

1. The spin coherent state of diesel fuel increases the efficiency of its combustion, reduces the toxicity of exhaust gases and can improve environmental friendliness diesel engines.

2. The same conclusion follows from research on ECE R-49 and Euro II tests.

3. The use of coherent diesel fuel can be recommended for transport operated in urban environments, since the engines cars operate mainly in idle and acceleration mode.

4. Due to the fact that the content of NOx, CO, C, CxHy, and PM in exhaust gases coherent diesel engine below ECE requirements

R-49 and Euro II, it is possible to recommend abandoning engine equipment

exhaust gas afterburner filters. In this case, an increase in engine power and reduced diesel consumption.

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