IMPROVING THE ENERGY EFFICIENCY OF ELECTRIC CARS USING THERMOELECTRIC MATERIALS

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Abstract: Currently, microchips that perform important tasks in the field of electric vehicles are made of semiconductor materials and thermoelectric materials, and are important for manufacturers of all electronic devices and gadgets. One of the most important tasks for the manufacturers of electronic devices and gadgets is to receive and reprocess semiconductor materials in the delivery of orders for microcircuits, and to repair electrical panels and interior lighting lamps as a result of waste heat processing.

Key words: automotive engineering, electronic device, semiconductors, semiconductor microchips, microcircuits, thermoelectric material.

ENTER

As a result of the development of science and technology, the economy and the machine-building industry are developing rapidly. The development of the economy and industry requires serious research on the creation of high-strength, easy-to-use, cheap, precise materials and on increasing the durability of the connection. In the coming years, we can see that energy consumption in the world is increasing at a high level. This, in turn, has an impact on the automobile industry. Measures to reduce various harmful gases released into the environment and nature have not bypassed the auto industry (Figure 1). In this regard, it has led to the development of electric vehicles such as Hybrid and electric vehicles, battery electric vehicles. Electric cars presented by the world's leading automobile manufacturers such as Mercedes-Benz, Toyota, Honda, BMW, Chevrolet, and Mitsubishi have managed to gain a place in the world market. As a result of re-equipment of electrical parts of the internal combustion engine on the basis of thermoelectric materials of different levels, researches aimed at reducing electricity consumption are being carried out [1-2].

LITERATURE ANALYSIS:

All types of vehicles using internal combustion engines emit waste heat energy into the environment. About 25% energy efficiency can be achieved by placing thermoelectric materials in heat pipes. Depending on the location of thermoelectric materials and their efficiency, energy savings can vary from 35% to 45%. In recent years, there has been an increase in demand for electric cars, and interest in developing this efficient system has increased [3-4]. This is due to the advantages of offering no moving mechanical parts, which results in low maintenance, smaller size, light weight and noiseless system. Thermoelectric materials directly reduce heat loss. converts into electricity [5-6].

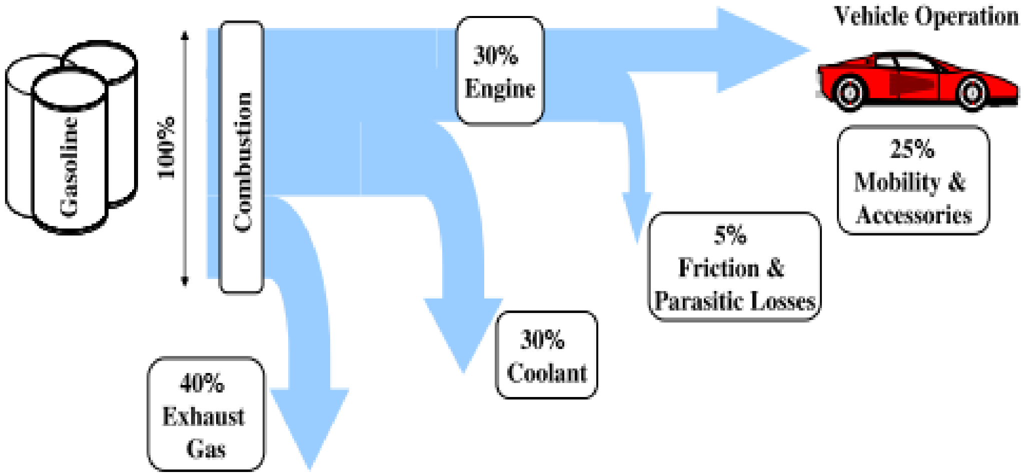

Figure 1. Energy consumption of a car with an internal combustion engine.

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By managing waste heat in the vehicle, thermoelectric generators are placed in the heat pipes, and thermoelectric materials are additionally used to recycle waste heat in heater compartments and mechanical stacks (Figure 2).

RESEARCH METHOD

In this article, effective methods of converting waste heat into electricity through thermal electric generators and their various solutions are considered. The thermoelectric generator module is connected to an internal combustion engine vapor heat exchanger for heat exchange [9-12]. The temperature difference between the hot and cold surface was maintained from 10°C to 80°C. The resulting estimate of output voltage and power is obtained through thermoelectric generators.

Modern material science occupies an important place in the study of the composition, structure and properties of material alloys, as well as the relationship between the structure and properties of the material [10-12]. Metals and semiconductors are the most used materials in our daily life. Semiconductor materials and metals play an important role in the development of human material culture. In fact, there is no sector of the economy where semiconductors and metals are not used [12-15].

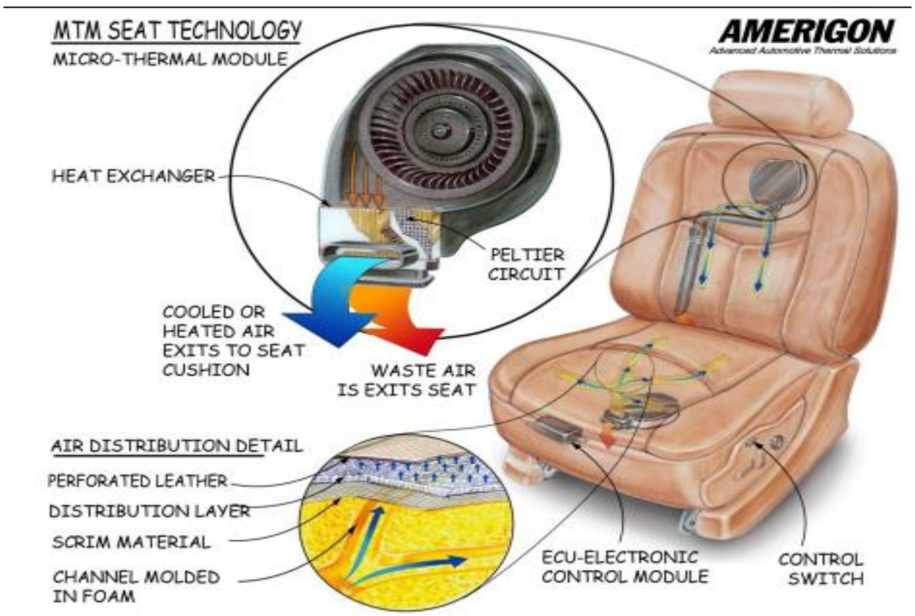

Figure 2. Methods of heating seat parts using thermoelectric materials.

There are conflicting issues in the selection of materials for machine parts and in the technological process of processing them. For example, the details used in the creation of machines and mechanisms that can ensure safe operation for a long time should be cheap, compact, neat, and made of high-quality materials [14-20]. It goes without saying that the processing of such materials causes a sharp increase in cost.

In solving such complex engineering problems, materials science and materials science of semiconductors, as well as technology of construction materials, are of great importance (Fig. 3).

To date, microchips and thermoelectric materials that perform important tasks in the automotive industry are made of semiconductor materials, and thermoelectric materials and chips are important for manufacturers of all electronic devices and gadgets. Manufacturers of electronic devices, microcircuits and thermoelectric generators face many problems in obtaining and remanufacturing semiconductor materials to deliver orders [16-18]. This, in turn, delays the car manufacturers' ability to provide customer service and the delivery of cars to their owners. It leads to the creation of artificial barriers by itself [19-20]. The failure of microchips to arrive on time forces the suspension of some branches of the automotive company. When resuming operations, chipmakers lag behind existing demand due to the fact that it takes more than six months to produce. Because of this, there is a shortage of semiconductor microchips for cars [20-25].

A shortage of semiconductors and a shortage of quality thermoelectric generators are a concern for hybrid and electric vehicle manufacturers around the world. The lack of such small but irreplaceable details has had serious consequences for car manufacturers. Another example is Volkswagen's plant in Kaluga, which stopped production of cars due to a shortage of semiconductors. Also, assembly of "Volkswagen" and "Skoda" cars was temporarily stopped in Nizhny Novgorod. Many of the world's largest automotive manufacturers have been forced to shut down their factories in Asia, Europe and North America due to shortages of semiconductors and thermoelectric materials. These include Ford Motor, Nissan Motor, Toyota Motor, Volkswagen, Honda Motor and Volvo. The US automotive industry warned about the consequences of improper use of microcircuits and asked for help from the government. Asia is speeding up microchip production to reduce semiconductor shortages.

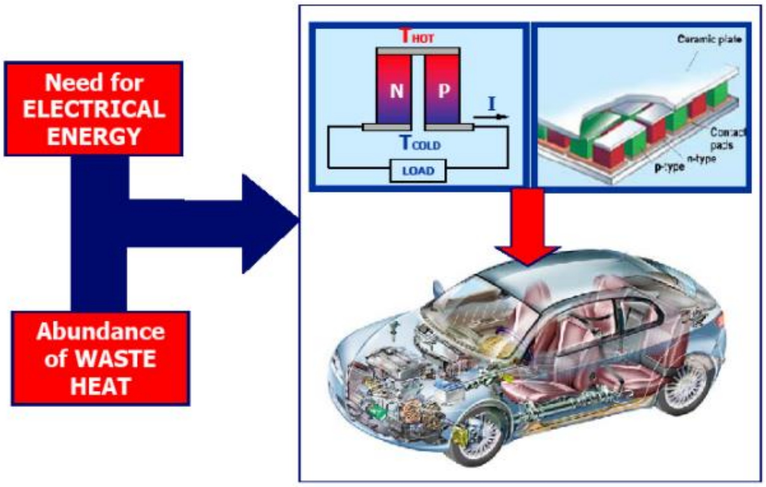

Figure 3. Application of semiconductor microchips and t hermoelectric materials.

CONCLUSIONS.

In conclusion, it shows that semiconductor physics and semiconductor materials science are given great attention and that large investments should be allocated to the development of these fields. The shortage of semiconductors is a concern for the automotive industry. The lack of such irreplaceable details has had serious consequences for car manufacturers. We can see that the use of thermoelectric materials in cars can increase the capabilities of future cars. Although vehicle electrification may challenge thermoelectric prospects for waste heat recovery, they increase thermoelectric capabilities in heat management.

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