



Development of Technology for the Production of Compositive Materials for the Manufacture of Automobile Spare Parts on the Basis of Secondary Polymer Raw Materials

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Annotation: The scientific significance of the results of this work is determined by the creation of a scientific basis for the production of modifiers and composite materials with previously known properties. The effect of the amount of various modified additives on the physical and mechanical properties of the obtained composite was studied.

Composite materials have been used in the automotive industry for many years and their quantity is increasing every year. If in the past composite materials were mainly used as interior decoration and there are details that do not drop large loads, today polymers have started to be used in bulky housings and several foreign companies have started to produce cars made entirely of composites. The search for an alternative raw material to the precious metal in the automotive industry began almost from the time when the automotive industry emerged. Henry Ford was one of the inventors in this field. In the 1930s, he began a research program aimed at creating durable plastics made from agricultural products. As a result, parts made of plastic (decorative speaker grilles, instrument panel frames, handles, buttons) are already widely used in Ford cars. During World War II, the use of this material became more relevant (the need arose to save steel), and in 1942, the American inventor's corps patented a car almost made of plastic. The mass of the car turned out to be 30% less than its metal analogue. In addition, the strength was 10 times higher.

Today it is necessary to scientifically substantiate the solutions to a number of problems related to the production of composite materials based on polymers. In particular, the choice of different modifiers for filling polymers with macro-sized mineral fillers; strengthening the adhesion on the surface of mineral fillers with polymers by using adhesion promoters to improve the physical and mechanical properties of polymer composite materials; creation of materials with high strength and fire resistance properties [1].

The modern development of the economy requires the creation of a wide range of thermoplastic polymer materials, as polymer products cannot meet the demand for materials with different fog properties despite being produced in large quantities [2].

It is the development of the automotive industry, the growing demands on the quality and safety of materials used that require the creation and application of new types of composite materials. In particular, the declining use of metals in this area shows how urgent the issue is.

In our study, work was carried out to obtain composite materials filled with minerals for the production of automotive parts based on secondary polymer raw materials.



The oxygen index of the obtained composite materials was determined by the combustion method.

Table 1

Mineral fillers: temperature and combustion resistance of composite materials based on basalt and polymers polyamide and polyethylene

Композиция таркиби	Ёниш вақти, с	Ҳавода ёниш вақтида масса йўқотилиши, %	Кислород индекси, % ҳаж.	Деструкциянинг бошланғич ҳарорати, °С	700°С даги кокс қолдиғи %	Вика бўйича иссиқ бардошлик °С
ПА-6	240	58	20	280	18	95
ПА-6/БТ	120	27	25	284	38	102
Р-У 342	255	62	19	270	12	90
Р-У 342/БТ	110	30	24	270	30	100

With the addition of fillers to the polymers PA-6 and P-Y 342, the oxygen index increased from 19 to 25 and 24%, respectively (Table 1).

As a result of filling the polymers with fillers, their burning time is twice as slow as that of the original polymer, and the mass loss during combustion in air is also reduced. The reduction of flammability of polymers with the addition of fillers confirms that the composite materials formed are difficult to combust.

Thus, we can conclude that several problems need to be addressed in order to continue the more successful introduction of composite materials in the automotive industry. First, shortening the production cycle of parts to a few minutes, which allows them to be mass-produced and reduce the amount of equipment required. Second, to ensure their optimal market value, which is related to both the solution of the first problem and the decline in raw material prices. Finally, it will be necessary to create modern automated production facilities that involve specialists in the design and development of modern technological processes, as well as to support structures from polymer compositions throughout the life cycle.

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