**POSTER PRESENTATIONS**

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# CHEMICAL SYNTHESIS OF PYROTECHNIC SUBSTANCE USING ADDITIVE TECHNOLOGY

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Additive technologies are called the technology of creating products with difficult geometric shapes due to layer-by-layer synthesis or layer-by-layer growing of products using a digital 3D model.

A distinctive feature of traditional technologies is the manufacture of parts by subtracting material from the workpiece; in a 3D printer, parts are built by adding material layer by layer to obtain the finished product. In the traditional processing method, after the completion of processing, there remains waste material (in some cases reaches 70%) which must be disposed of, and in additive technologies the waste remains in a minimal amount or is absent [1].

Advantages of additive technology:

Improved properties of the finished product: Due to the fact that the products are built in layers, they have a unique set of properties.

Saving raw materials: in additive technology they use almost the amount of material required for the manufacture of the product.

Production of products with complex geometric shapes: additive technology allows the manufacture of products, which in the manufacturing process by conventional methods have many difficulties. An example of this is a part inside a part or very complex cooling systems based on mesh structures.

Accelerating data exchange and mobility of production: to model a product, only a computer model of the printed material is required, which is simulated in a computer before printing using special software, for example, Solid works. Printing media can be different, for example, some technologies use a photosensitive resin, which when polarized with a light or laser from a DLP (Digital Light Processing) projector is polarized (SLA-printing).

In Fused Deposition Modeling (FDM) printing, a number of elastomers can be used including acrylonitrile butadiene styrene (ABS). In FDM printing, the process is physical. The necessary polymer thread passing through a hot nozzle becomes liquid or semi-liquid. The molten portion of the material is fed through a nozzle (extruder), and the yet-molten material is used as a piston to extrude through the extruder. The molten material is fed to the place where it is needed. In this case, the nozzle is displaced along the X and Y coordinates. After that, it is printed as one layer of the sample, the platform is lowered or the extruder rises along the Z axis to the distance of one layer and the next layer is printed by the extruder. The platform lowers until the model is complete. This method creates parts of sufficient rigidity, which can be used for different purposes [2].

Energy-intensive materials in modern science takes a different place. Since they are carriers of a large amount of energy. Using 3D modeling, you can print the necessary model, modeled using software. Pyrotechnic substances with a certain geometric shape is very important, because the

geometric shape of the substance directly affects the combustion process, since it determines the distribution of thermal energy in space. At the moment, there are articles on the printing of pyrotechnic substances in which thermoset mixtures are used as consumables, which consist of an oxidizing agent and a combustible substance.

Analyzing the literature data, a mixture consisting of a termite mixture Al:$Fe_2O_3$, and nitrocellulose as a binder was selected. The energy efficiency of this mixture will be high, since both components are high-energy compounds.

**References**

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