Innovation Material for 3D Printing

Researchers of Siberian Federal University are working on the creation of a new material – wire with a high content of transition and rare-earth metals, which will be used in 3D printing of various parts. The project is being implemented within the framework of the Yenisei Siberia competition for interdisciplinary fundamental scientific research, which is jointly organized by the Russian Foundation for Basic Research, the Krasnoyarsk Regional Science Foundation and Scientific and Production Center for Magnetic Hydrodynamics.

Today, additive technologies make it possible to manufacture parts of any shape directly from 3D digital models without waste and are used in many industries: from mechanical engineering and medicine to the national economy. Moreover, the quality of the products manufactured by this method largely depends on the material used in printing.

"Our goal is to develop a technology for producing wire from aluminium alloys with the content of transition and rare-earth metals that will allow obtaining special physical and mechanical properties of the final products," explains **Yury Gorokhov**, manager of the project, Doctor of Engineering, and professor of Siberian Federal University. *"This material is in demand not only in Russian production, but it can also have great export potential."*

Among the requirements for the new material for 3D printing is absence of casting defects, porosity, a fine-grained dispersed structure, as well as strength in a wide temperature range, high electrical conductivity, radiation protection, plasticity, etc. This will be achieved by direct energy deposition using a laser, electron beam or plasma as an energy source. This way, the experts expect to obtain parts with a complex of high strength properties at the nanostructural level, which cannot be obtained using the conventional technologies. By the autumn, scientists are planning to test the first prototypes of the wire.

In total, within the framework of the Yenisei Siberia competition in 2019, 13 projects were supported, and the total budget of the competition, taking into account trilateral funding, was about 60 million roubles.

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