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RUSNANO to Invest in Basalt Plastics Production

RUSNANO and Galen company have signed an investment agreement for establishing production of composite nanostructured polymer based on basalt fiber. The project has a total budget of 500 million rubles of which RUSNANO will co-invest 200 million rubles. Project planners expect production to reach 2,500 tons to 3,000 tons in 2016. Products include shaft lining for the mining industry; armature, flexible connectors, and rawl plugs for the construction industry; composite alluvial drill rods for oil production; and poles for street lighting and power transmission lines.

Basalt plastic armature is as strong as steel and a great deal more durable. Moreover, composite material based on basalt fiber does not corrode. This is very important for structures that must operate where moisture is high or salt is present, particularly bridge supports. The material is considerably lighter than steel (on average 70 percent), simplifying transportation and making it less costly. Under some circumstances, the material extends the service life of equipment by reducing the stress load, for example, in alluvial drill rods used to produce oil. Because the composite is shock absorbent and impact safe, the material is ideally suited to street lighting poles.

“Galen is experienced in developing unique technological solutions. Take, for example its armature for construction of a single-span bridge in Northern Ireland or its flexible connectors for the Passive House in England, an innovative project. By the way, the strict requirement the British had for fire resistance of materials prompted the company’s engineers to begin experiments with nanomodifiers for polymer connectors,” noted RUSNANO Managing Director Alexander Kondrashov.

The composite materials that Galen manufactures contain basalt fiber produced using pultrusion, a continuous molding process, with an epoxy binder that is resistant to halogens, acids, and alkalis. The disadvantage of the composite’s relatively low combustion temperature has been overcome by adding to the epoxy binder a small amount of nanoparticles of aluminosilicate montmorillonite based largely on clay. This also improves the strength of the composite under flexion.
Technical information

Pultrusion is a production technology for manufacturing construction industry items using plastic fibers in a continuous process. The name pultrusion comes from the English words pull and extrusion. Saturated with polymer binding material, the filler (rope, linen, woven tape, fiberglass, carbon fiber, or organic fiber) is stretched through a heated die that determines its form. The polymer binder is usually made of epoxy resin, unsaturated polyesters, or thermoplastics. Galen uses epoxy resins to which nanoparticles of aluminosilicate montmorillonite have been added for chemical stability, resistance to heat, and impact and fatigue endurance.

Diagram of Galen’s pultrusion unit.

This particular method for preparing composite materials has superior compatibility with the environment: CO₂ emissions during production of a single run of basalt plastic are one thirty-fifth to one forty-ninth the CO₂ emitted during production of regular steel or stainless steel armature. Measured by energy consumption, a kilogram of the composite armature requires only two kilowatts to produce while a kilogram of the steel armature consumes three times the energy.

RUSNANO was founded in March 2011 as an open joint stock company through reorganization of state corporation Russian Corporation of Nanotechnologies. RUSNANO’s mission is to develop the Russian nanotechnology industry through co-investment in nanotechnology projects with substantial economic potential or social benefit. The Government of the Russian Federation owns 100 percent of the shares in RUSNANO. Anatoly Chubais is CEO and chairman of the Executive Board of RUSNANO.

Work to establish nanotechnology infrastructure and training for nanotechnology specialists, formerly conducted by the Russian Corporation of Nanotechnologies, has been entrusted to the Fund for Infrastructure and Educational Programs, a non-commercial fund also established through reorganization of the Russian Corporation of Nanotechnologies. For more information, please visit the company website at www.rusnano.com.

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