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Graphene Nanotubes in Plastics Are the Basis for Creating Light, Energy-Efficient and Environmentally Friendly Cars of the Future

Given the ongoing fundamental transformation of the automotive industry, increasingly more stringent environmental requirements, and the transition to electric vehicles, today's automakers around the world display a keen interest in new polymers created with nanomaterials. Modification of plastics with graphene nanotubes provides impressive results in anti-friction and anti-wear coatings and exterior parts painted using the electrostatic painting method.

The Research and Production Company "POLYPLASTIC", a leading Russian manufacturer of compound materials, develops and introduces nanocomposite polymeric materials using TUBALL™ graphene nanotubes synthesized by OCSiAl. One of their latest developments is the nanomodified glass-filled polyamide 6.6 known under the trade name Armamid. Introducing as little as 0.15 wt.% of TUBALL™ MATRIX 826 (a concentrate of graphene nanotubes) into polyamide results in the insulation resistivity of 10^6 to 10^8 Ω cm, required by the industry standards, while strength properties of the material are retained.

"Introducing nanotubes into polyamide drastically changes the properties of that material making it electrically conductive, which allows us to paint plastic parts without using a separate line. This significantly reduces the cost of production technology, making it more efficient and environmentally friendly. Unlike the previously used technological methods, nanomodification of polyamide ensures a constant resistivity level and does not have an adverse effect on the material's durability", says Alexandr Zimnyakov, OCSiAl Vice President for Sales in Russia and the CIS.

Production of car exterior parts from fiberglass-filled ARMAMID® with graphene nanotubes will be an innovative solution for the automotive industry. The preproduction testing of an electrostatically painted car fender made of a conductive polymer is scheduled to commence in 2020.

Technologies for introducing graphene nanotubes into various polymers including polyethylene, polypropylene and ABS plastic are also being developed today. Another current area of developments is nanomodified polypropylenes for electric vehicle components meant to reduce their weight.

"The impressive results we already see today confirm that the future of many industries may be associated with nanotube-modified materials, and R&P POLYPLASTIC has the necessary research and production potential to achieve that", says Mikhail Katsevman, R&D Director at POLYPLASTIC.