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## 3D Printing with Graphene-Enhanced Materials: Methods and Applications

The market for 3D printing is expected to grow exponentially over the course of the next few years, even without factoring in the likelihood for advances in both printer and filament technologies. One such advance is the use of graphene, a 2D material known for its strength and conductivity, in filament production. Adding graphene to filaments increases the strength of end-products made by 3D printing and adds conductivity – a major advancement when considering using 3D printing for energy storage and electronic applications.

The biggest challenge in developing specialty 3D printing filaments is the creation of materials which are functional, while maintaining their printability. Today's generation of 3D printers are designed to work with filaments made of thermoplastic materials; however using graphene as an additive to thermoplastics alters the 3D printing filament's inherent properties. This may cause a change in 3D printing parameters and, potentially, a decrease in the ability to 3D print. Dr. Polyakova will overview how Graphene 3D addresses the challenges to using graphene nanoplatelets

as an additive in thermoplastic materials, and maintains printability in the end-product.

The ability to create custom-made objects for use in many different industries is arguably the most important aspect of 3D printing. Due to its conductivity, Graphene 3D Lab's Conductive Graphene Filament has myriad applications in custom-made electronics, energy storage devices, and capacitive sensors. In her talk, Dr. Polyakova will also overview Conductive Graphene Filament's role in innovations to 3D printed batteries, PCB's, and tablet controllers.

