MesoGrafTM for advanced graphene-based composite materials: 3D printable inks, reinforced and conductive polymer composites and foams

Quang Binh Ho

Grafoid, Canada

bho@grafoid.com

Grafoid Inc. has developed a portfolio of valuable graphene-containing materials including 3D printable inks, polymer composites and foams. These advanced materials utilize MesoGrafTM, a near defect-free, high-purity graphene produced with Grafoid's patent-protected process that is both scalable and environmentally sustainable. Our printable liquid materials, which are designed to highlight performance features of graphene as a nanomaterial additive, have low electrical resistivity in the range of 0.005-0.1 Ohm-cm. These 3D inks are suitable for different printing methods such as extrusion and UV-curable inkjet printing. In nylon composites, our graphene shows excellent dispersion in the polymer matrix, producing a low electrical percolation threshold of 1.9 % v/v, and good reinforcement to the nylon matrix. When graphene was added at 15.0% v/v, the mechanical stiffness and thermal conductivity significantly increase by 170% and 1300%, respectively. Our polypropylene-based foams achieved well-defined foam morphologies with high cell density with cell diameter in the range of 20 µm – 60 µm, and large processing temperature window. At 9 wt% of graphene, the compressive stiffness increased by 500%. These products have the potential to position Grafoid as the leading graphene company in advanced materials industry.