Development of Nano-Composites which include Plasma Functionalized Graphene Nanoplatelets

J. Williams, S. Rahatekar, M. Williams

ACCIS, Bristol University, Bristol, United Kingdom
John.David.Williams@bristol.ac.uk

Commercially available nanomaterials such as Graphene Nanoplatelets and Carbon Nanotubes are chemically inert, and as such are difficult to disperse in various materials such as polymers. Plasma functionalization is a method for improving the compatibility of the nanomaterials with a matrix by adding surface functionalization such as amine, hydroxyl and carboxyl groups. The functionalization can be tailored to match the matrix material, improving the processing behavior and improving the physical properties of the composite material when compared to the untreated nano material. There are also significant rheological differences between nano-carbons of different morphologies, for example Carbon Nanotubes tend to dramatically increase the viscosity of the nanotube resin mix, whilst Graphene Nanoplatelets have a negligible change of the rheological properties of the original matrix.