

Graphene-enhanced commodity plastics in real world applications

Presenting Author

Dr. Francis Nedvidek

Contributing Authors

Jacques Poulin

Dr. Helen Lentzakis

Dr. Nima Moghimian

Naiheng Song

Group NanoXplore Inc.
25 Boul. Montpellier, Saint-Laurent (Montreal)
Quebec, Canada H4H 2G3

nedvidek@nanoxplore.ca

Abstract

Graphene is considered a wonder material which draws tremendous excitement in both the academic and industrial spheres. This is because graphene is reported to be stronger than diamond and steel, more electrically and thermally conductive than most materials and impermeable to all gas molecules. For these reasons, graphene is expected to outperform other carbon fillers like carbon black (CB), carbon nanotubes (CNTs) and nanofibers in many applications. But is it so Graphene is considered a wonder material which draws tremendous excitement in both the academic and industrial spheres. This is because graphene is reported to be stronger than diamond and steel, more electrically and thermally conductive than most materials and impermeable to all gas molecules. For these reasons, graphene is expected to outperform other carbon fillers like carbon black (CB), carbon nanotubes (CNTs) and nanofibers in many applications. But is it so and can real world commodity plastics afford the cost of graphene?

References

- [1] Authors, Journal, Issue (Year) page
- [2] Authors, Journal, Issue (Year) page
- [3] Authors, Journal, Issue (Year) page

Figures

	Thickness	Lateral dimension	Aspect ratio
Graphite	20-30 um	400 um	~ 15
Carbon fiber (SCF)	7-10 um	7-10 mm	~ 1000
heXo-G V20 (GNP)	20-30 nm	40-50 um	~ 2000

Figure 1: Physical Properties of Filler Materials

	Flex modulus (MPa)	Flex strength (MPa)	Tensile modulus (MPa)	Tensile strength (MPa)	Elongation at break (%)
HDPE 5502 (blow grade)	993	29.5	880	25.45	600
Graphite (10% wt)	1472	29.7	1106	27.42	30.5
GNP (10% wt)	1984	35	1371	29.38	37.6

Figure 2: Increase Mechanical Performance of Graphene Nano-Particles

	Flex modulus (MPa)	Flex strength (MPa)	Tensile modulus (MPa)	Tensile strength (MPa)	Elongation at break (%)
HDPE 5502 (blow grade)	993	29.5	880	25.45	600
Graphite (10% wt)	1472	29.7	1106	27.42	30.5
GNP (10% wt)	1984	35	1371	29.38	37.6

Figure 3: Mechanical Performance of Graphene Nano-Particles and Short Carbon Fiber

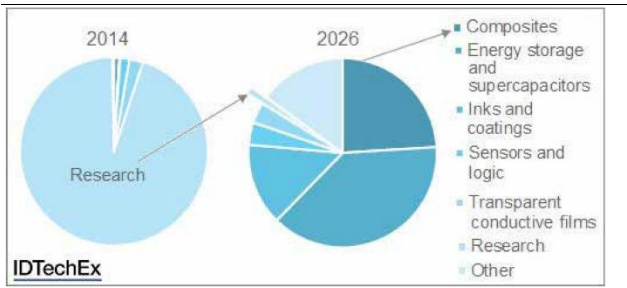


Figure 4: Graphene Sales Forecast