Graphene 3D Lab Inc.

Graphene Lab Inc.

Advanced graphene composites: 3D printing and beyond

Dr. Elena Polyakova, CEO

TSX-V:GGG

OTCQB: GPHBF

Forward Looking Statements

Information set forth in this presentation may contain forward-looking statements. Forward-looking statements are statements that relate to future, not past, events. In this context, forward-looking statements often address a company's expected future business and financial performance, and often contain words such as "anticipate", "believe", "plan", "estimate", "expect", and "intend", statements that an action or event "may", "might", "could", "should", or "will" be taken or occur, or other similar expressions. By their nature, forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause our actual results, performance or achievements, or other future events, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such factors include, among others, the following risks: the risks associated with outstanding litigation, if any; risks associated with adoption by industries of graphene-based products; additive manufacturing gaining market acceptance as an alternative for industrial manufacturing which will require acceptance of such factors as quality, price and speed at which products can be created; health and environmental factors affecting adoption of these technologies; reliance on key personnel; the potential for conflicts of interest among certain officers, directors or promoters with certain other projects; the absence of dividends; competition; dilution; the volatility of our common share price and volume; and tax consequences to U.S. Shareholders. Forward-looking statements are made based on management's beliefs, estimates and opinions on the date that statements are made and the Company undertakes no obligation to update forward-looking statements if these beliefs, estimates and opinions or other circumstances should change. Investors are cautioned against attributing undue certainty to forward-looking statements.

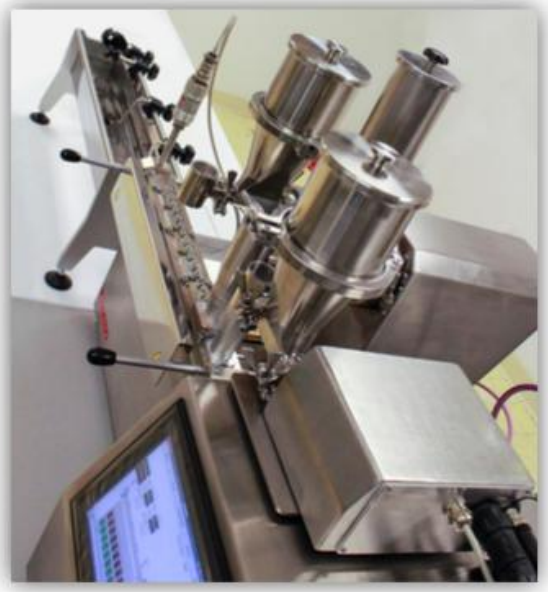
Disclaimer

The information in this presentation is historical in nature, and is current only to the date indicated in the particular presentation. This information may no longer be accurate and therefore you should not rely on the information contained in this presentation. To the extent permitted by law, Graphene 3D Lab Inc. and its employees, agents and consultants exclude all liability for any loss or damage arising from the use of, or reliance on, any such information, whether or not caused by any negligent act or omission

Introduction

- The Company is a recognized global leader in the commercialization of graphene nanomaterials.
- Renowned scientific team specializing in enhanced graphene applications and manufacturing
- Well-equipped R&D, QC, and production facility in Calverton, NY
- The Company owns a strong IP portfolio of 6 patent applications
- The Company currently sells more graphene specialty products than anyone else in the world to **12000** customers worldwide

Business Divisions



Portfolio of Advanced Materials

GRAPHENE SUPERMARKET

R&D Materials

BLACKMAGIC3D

Materials for 3D Printing

Industrial graphene-enhanced composites

TSX-V:GGG
OTCQB: GPHBF

Our Current Customers

Established customer base: nearly 12,000 clients worldwide including; NASA, Ford Motor Co., GE., Apple, Xerox, Samsung, MIT, Harvard, Honda, NIST, HP, Xerox, Cambridge, Oxford, US Navy, US Army, Caltech, Stanford University and almost every Fortune 500 tech company

R&D Materials

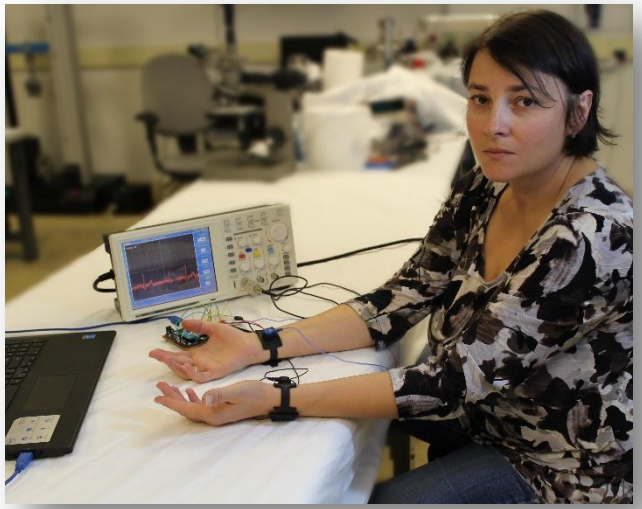
Highlights

- The world largest collection of graphene products
- In operation since 2010
- Products include:
  - Graphene wafers
  - Graphene Oxide
  - Graphene Nanopowders
  - Conductive Inks and Sheets
  - TEM Grids
  - Flexible graphene coatings
- Distributed under Graphene Supermarket® brand, www.graphene-suprmarket.com

GRAPHENE SUPERMARKET

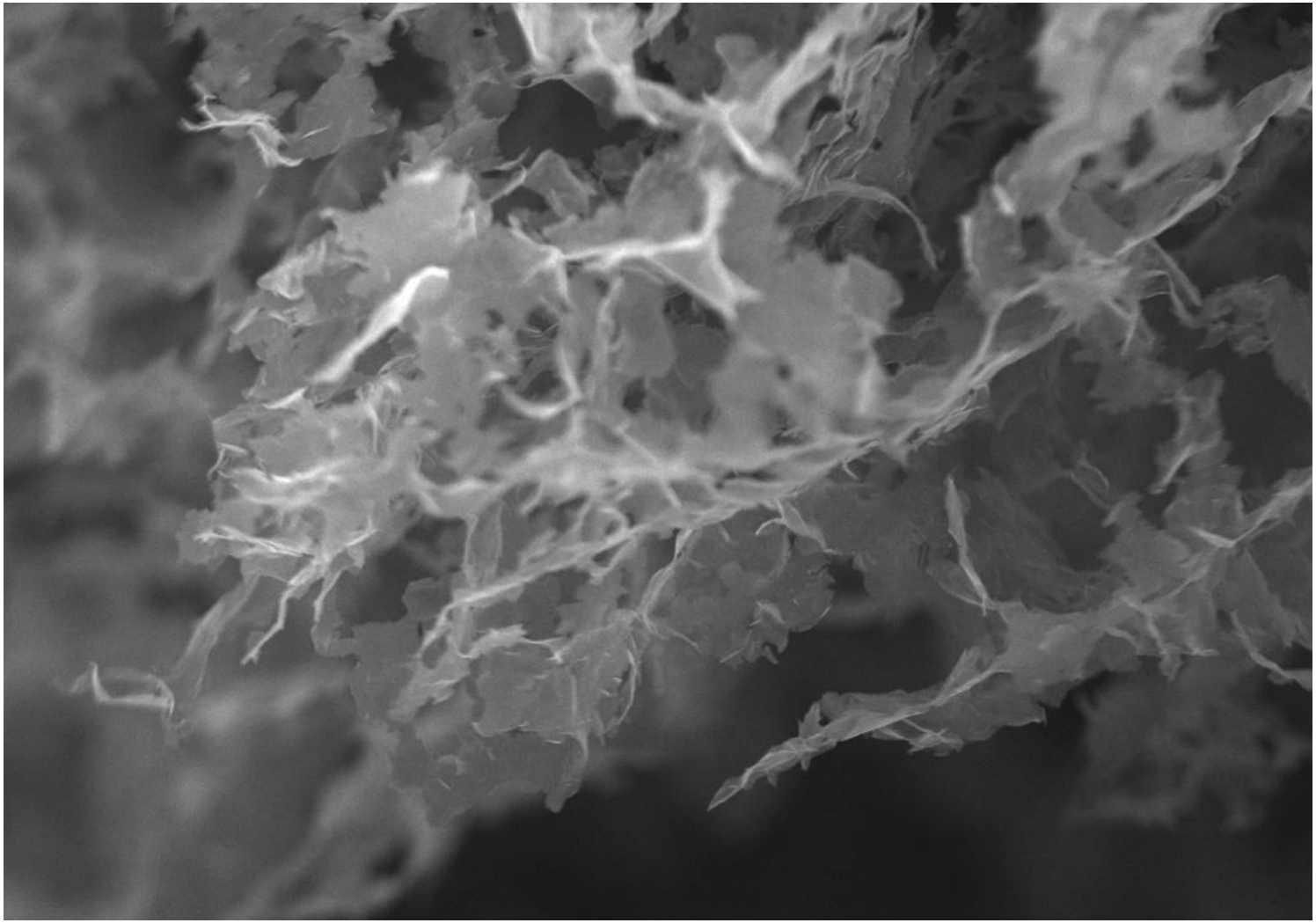
Materials for 3D Printing

- Materials portfolio include:
  - Magnetic
  - Flexible nylon
  - Conductive PLA
  - Flexible/Conductive TPU
  - Vibration Damping Graphene/Carbon Fiber HIPS
- Distributed under BlackMagic3D® brand, www.backmagic3d.com

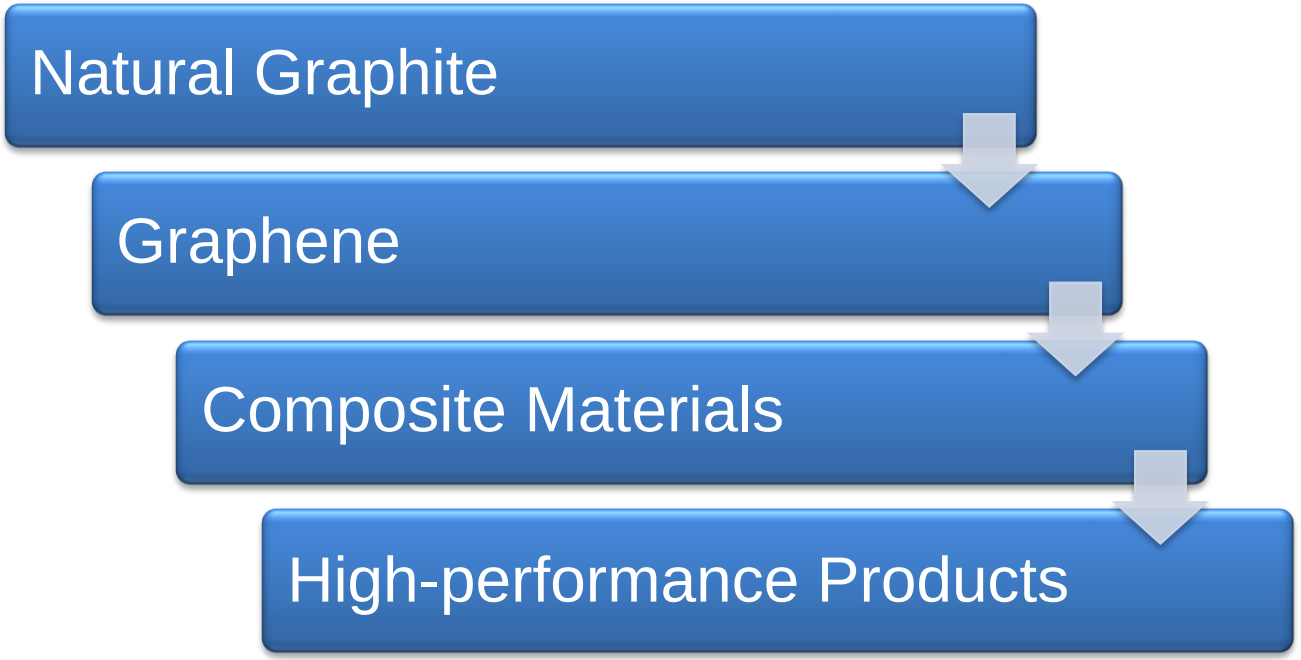


BLACKMAGIC3D

Production of Industrial Graphene Composites

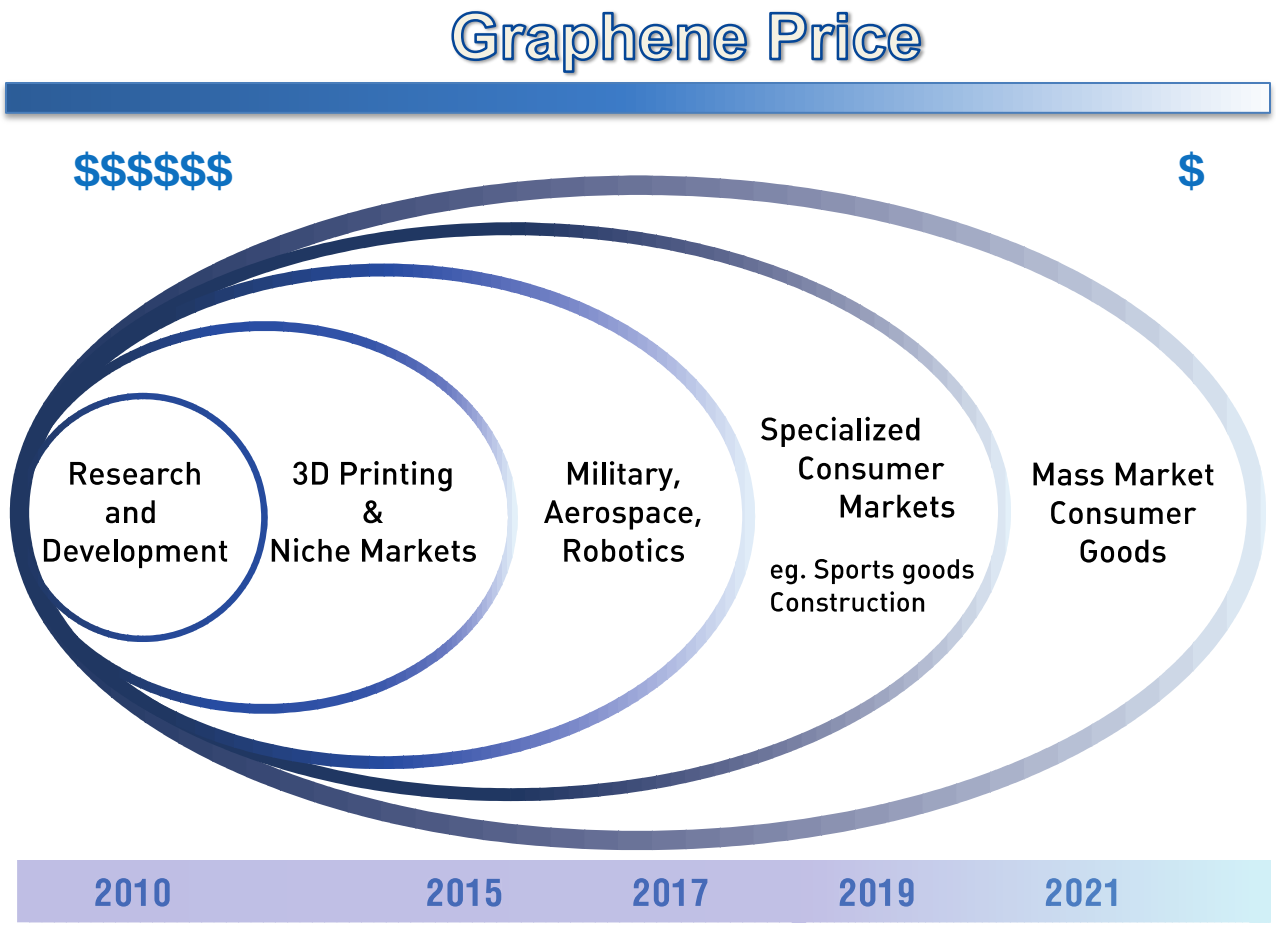


Production of Industrial Graphene

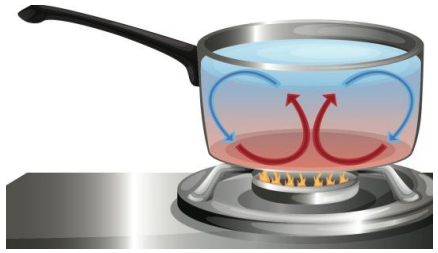


IP PROTECTION OF ALL TECHNOLOGICAL STEPS

Development Timeline

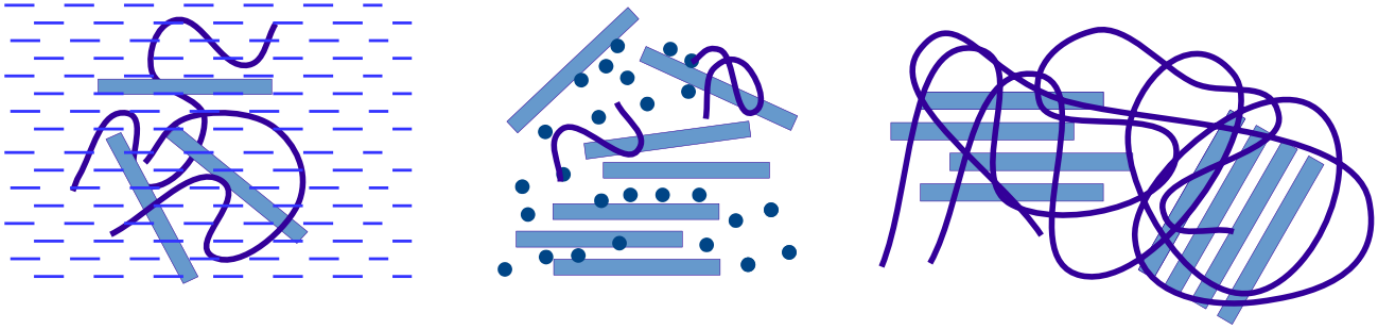


Graphene Composites

Conduct electricity	Conduct heat
$\times 10^6$-10^{12} 	× 3 
Mechanically strong	**Green Material**
	No metals 

Only a small percentage of graphene is needed to improve a polymer

Preparation of Nanocomposites

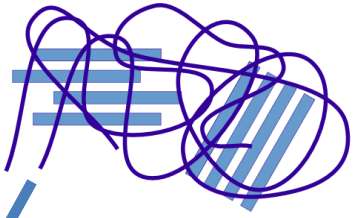


Mixing in Solution | In-situ polymerization | Melt mixing

Dispersion

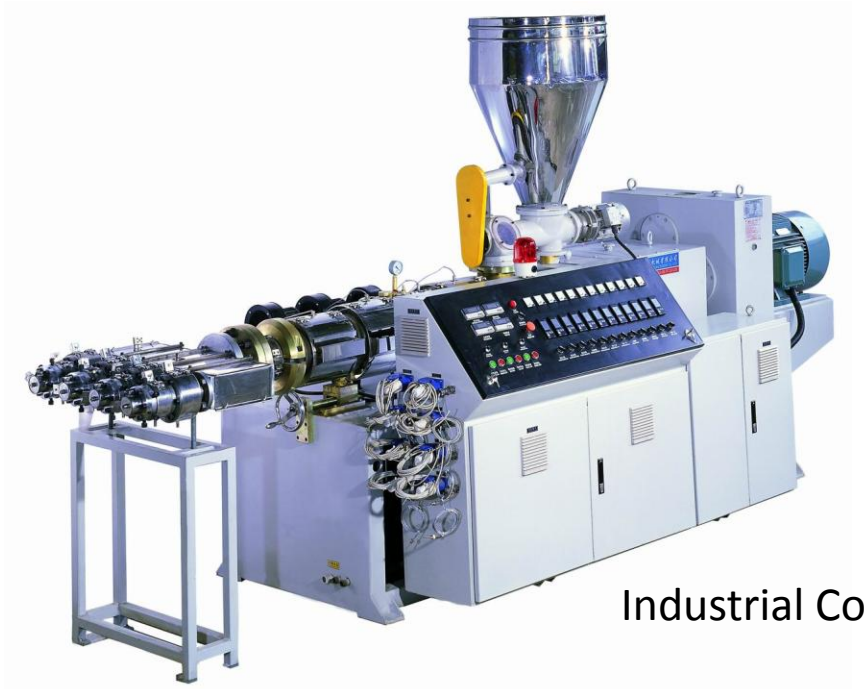
Physical	Chemical
• Sonication • Cavitation • Thermal or microwave expansion	• Oxidation/reduction • Functionalization • Intercalation • Use of surfactant

Preparation of Nanocomposites



Mixing in Solution: difficult to scale

Melt mixing: Scalable!



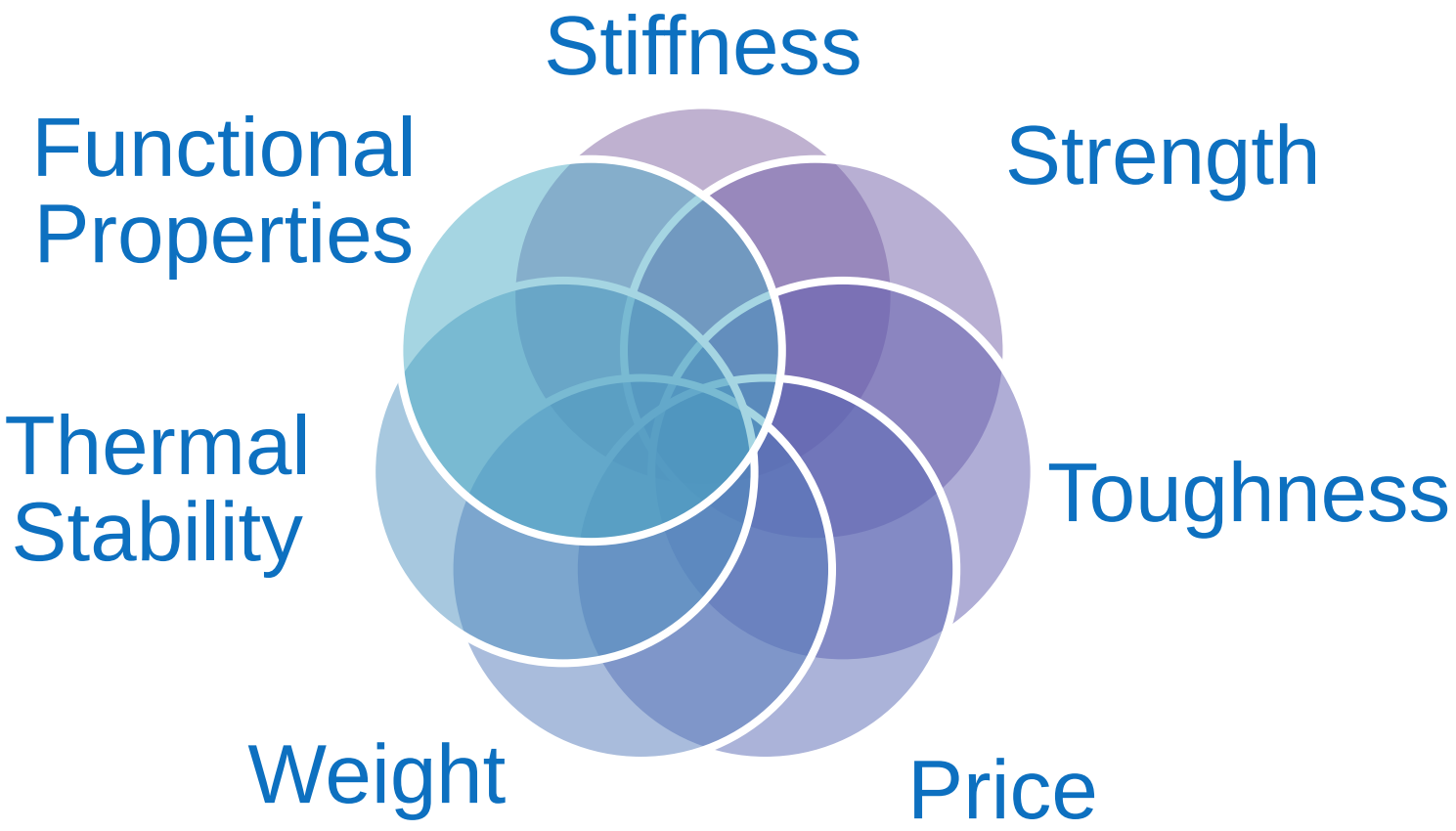
Industrial Compounder

Image Credit http://image2.cccme.org.cn/i_supply/2010-05-28/20100528125546000272493.jpg

G6-Impact™: Graphene Composites for Vibration Damping
Mechanical Properties of Polymer Composites

Focus on PERFORMANCE!

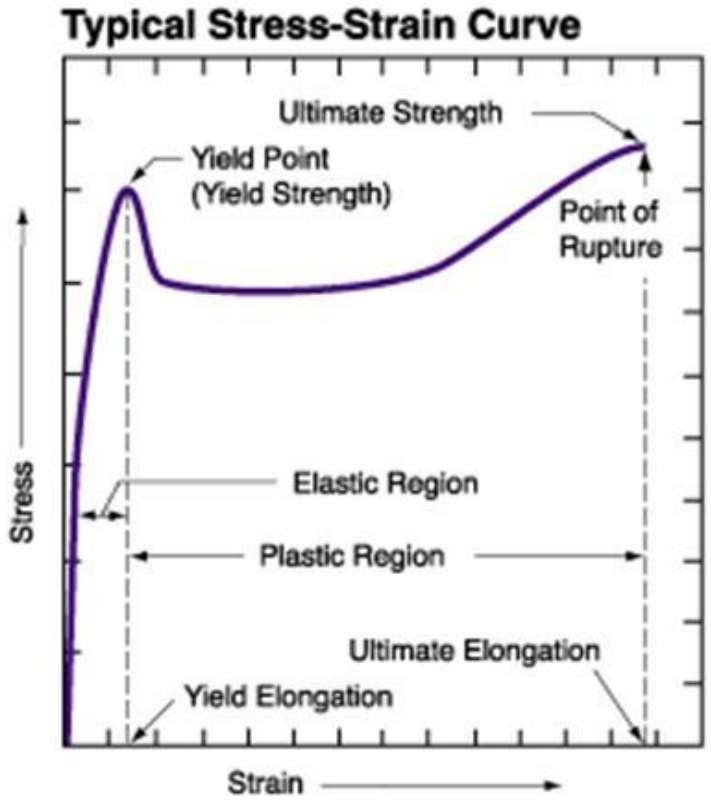
G6-Impact™: Graphene Composites for Vibration Damping
Mechanical Properties of Polymer Composites

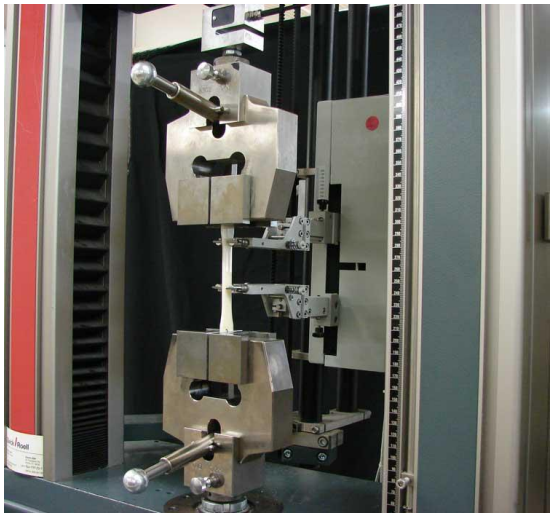


G6-Impact™: Graphene Composites for Vibration Damping

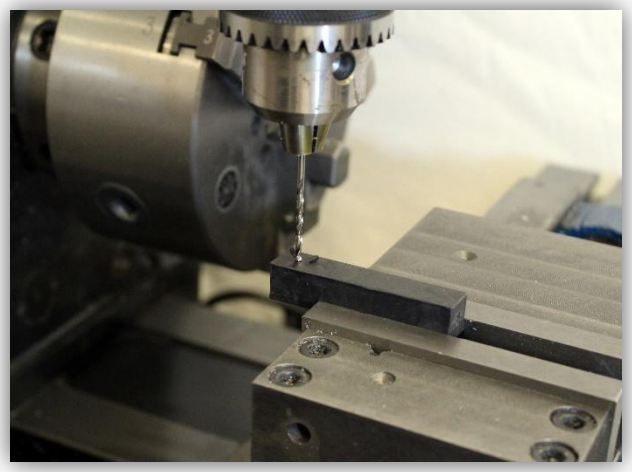
- HIPS/Graphene(<1%)/Carbon Fiber(20%) composite **G6-Impact™** introduced in Oct 2106
- **G6-Impact™** is semi-rigid material with outstanding vibration damping and shock absorbing properties
- While 3D filaments can be used to create models or prototypes, the same material can be used for ***mass manufacturing using thermoforming or injection molding.***

G6-Impact™: Graphene Composites for Vibration Damping
Introduction into Tensile Testing



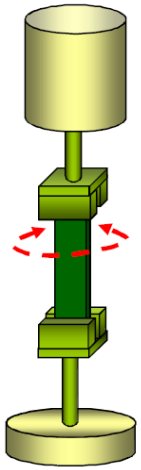


G6-Impact™: Graphene Composites for Vibration Damping
Introduction into Dynamic Mechanical Analysis (DMA)

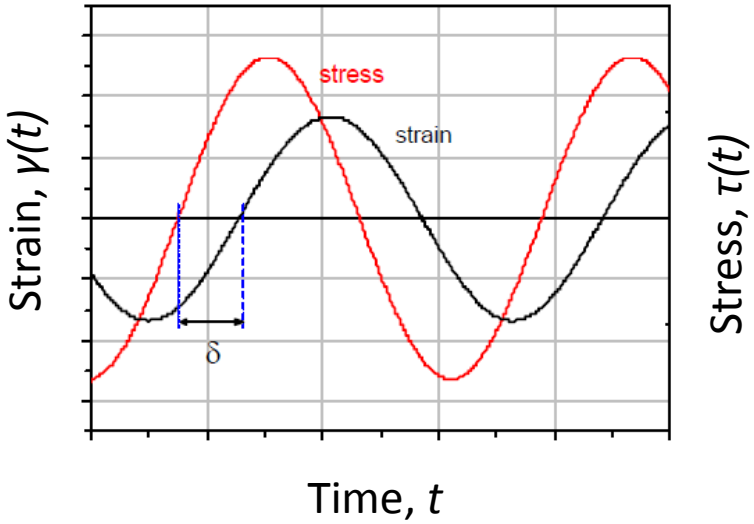


Parameter	Units	ASTM/ Method	HIPS Resin (matrix)	G6-Impact	Improvement, %
Storage Modulus	GPa (psi)	D 638	1.3 (191,000)	5.7 (836,000)	337
Tensile strength	MPa (psi)	D 638	25.9 (3,770)	34 (4,940)	31
Izod impact strength, (notched)	ft-lbs/in (J/m)	D 256	0.8 (42.9)	1.61 (85.9)	101

Measurements of the viscoelastic properties of the polymer in the torsion bar oscillation experiment



Torsion bar oscillation experiment

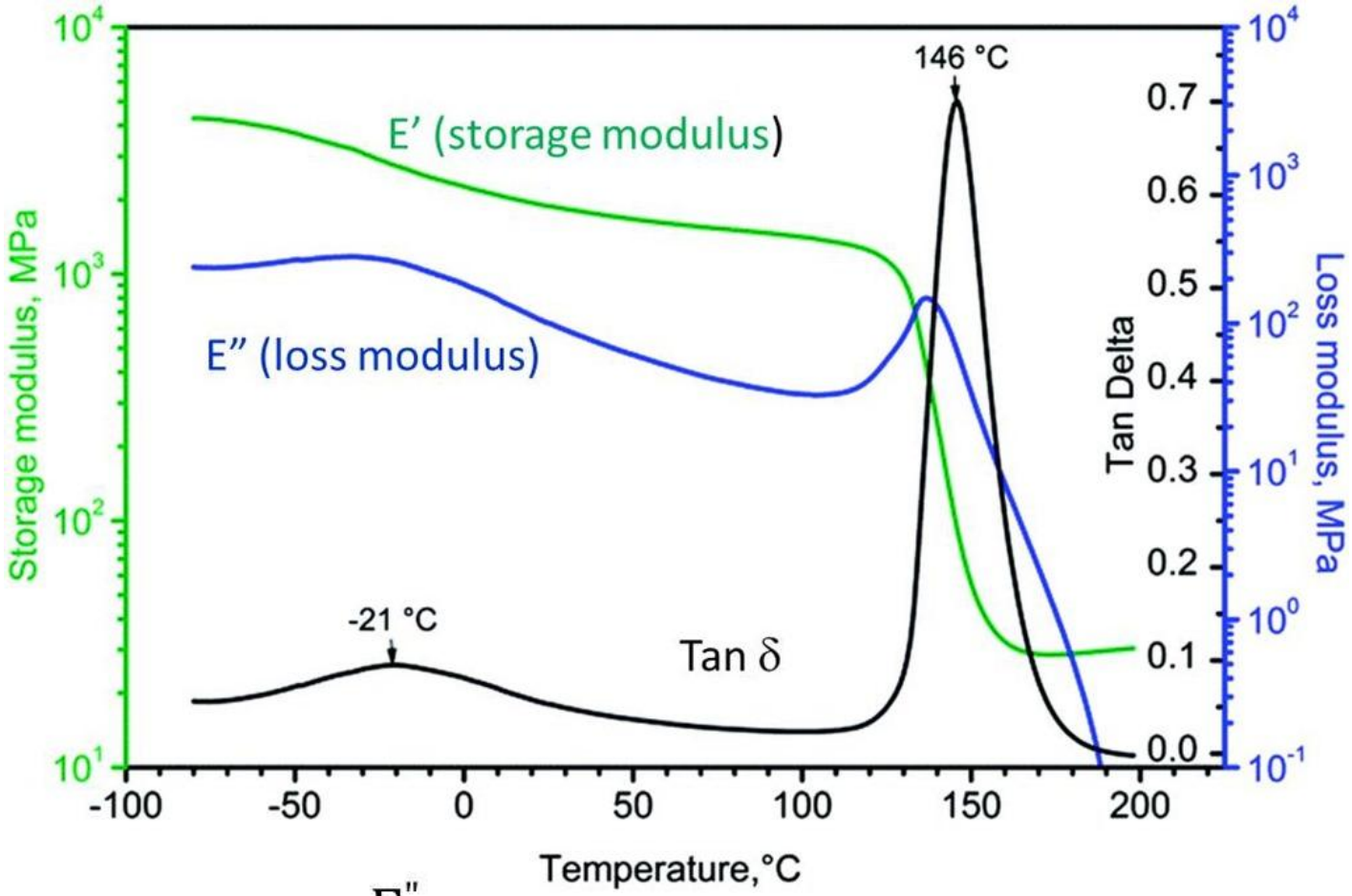


$$G' = \frac{\tau_0'}{\gamma_0}$$ elastic or in-phase modulus

$$G'' = \frac{\tau_0''}{\gamma_0}$$ viscous, loss, or out-of-phase modulus

$$\tan\delta = \frac{\tau_0''}{\tau_0'}$$

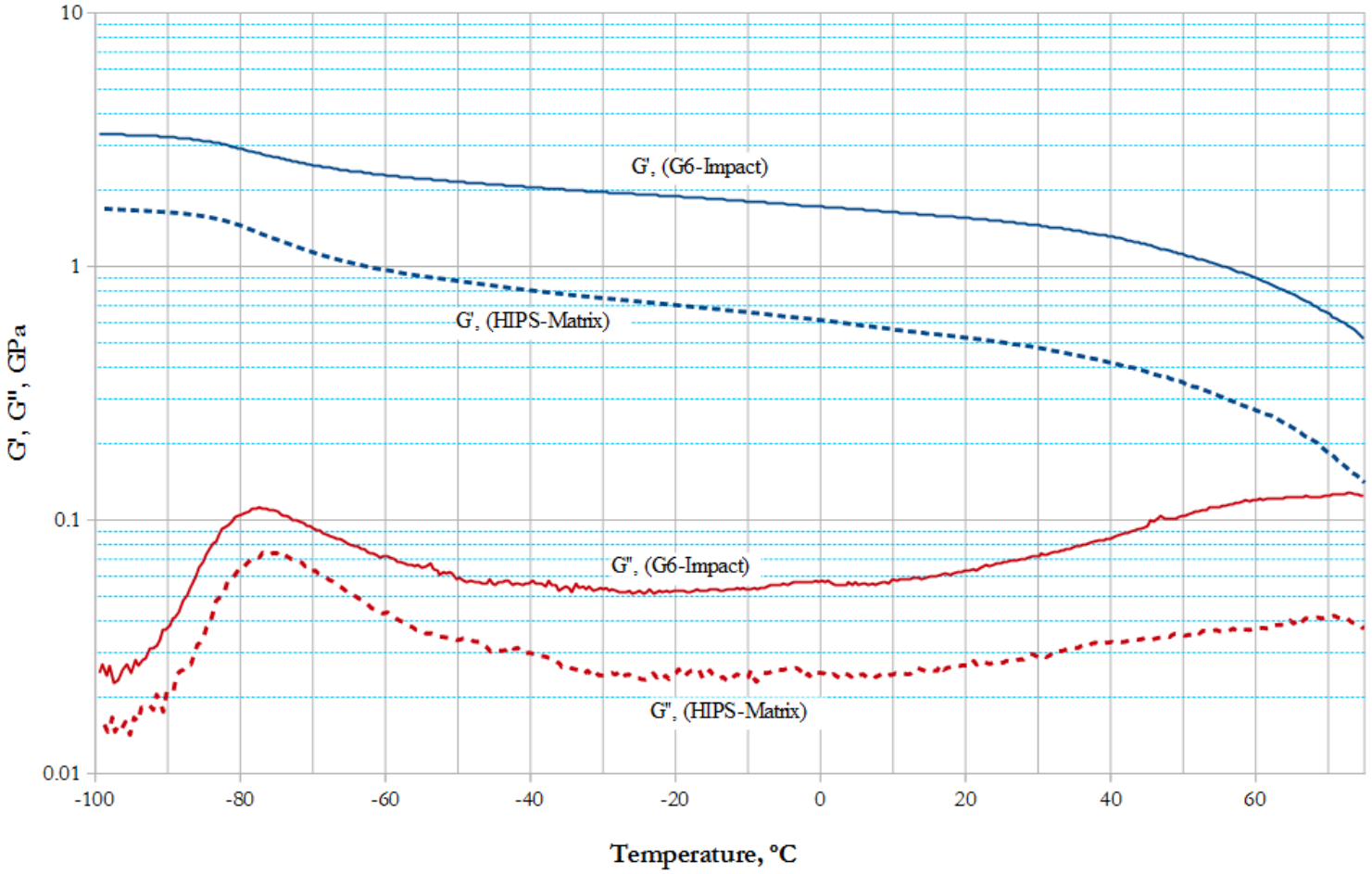
DMA Analysis: a Typical Polymer Matrix



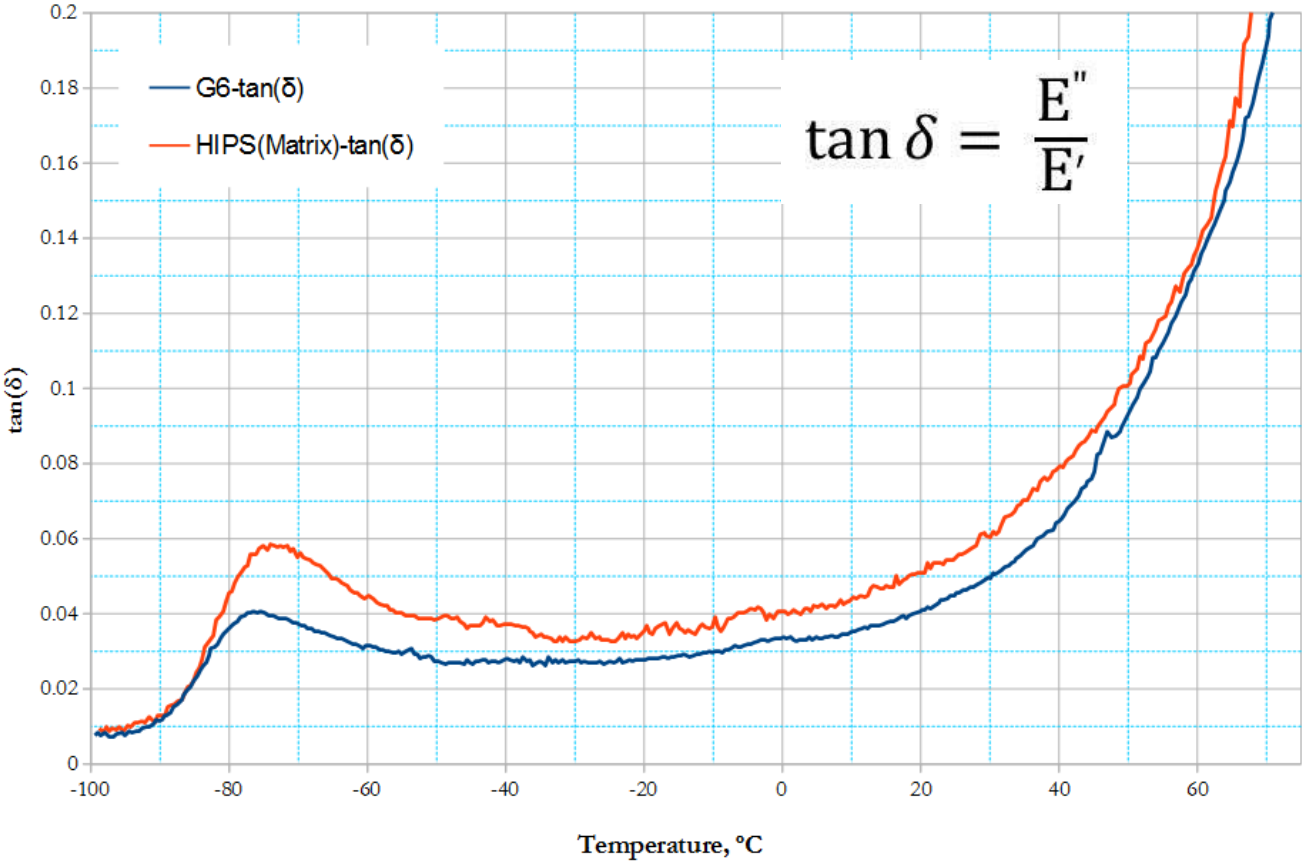
$$\tan\delta = \frac{E''}{E'}$$

http://polymerinnovationblog.com/

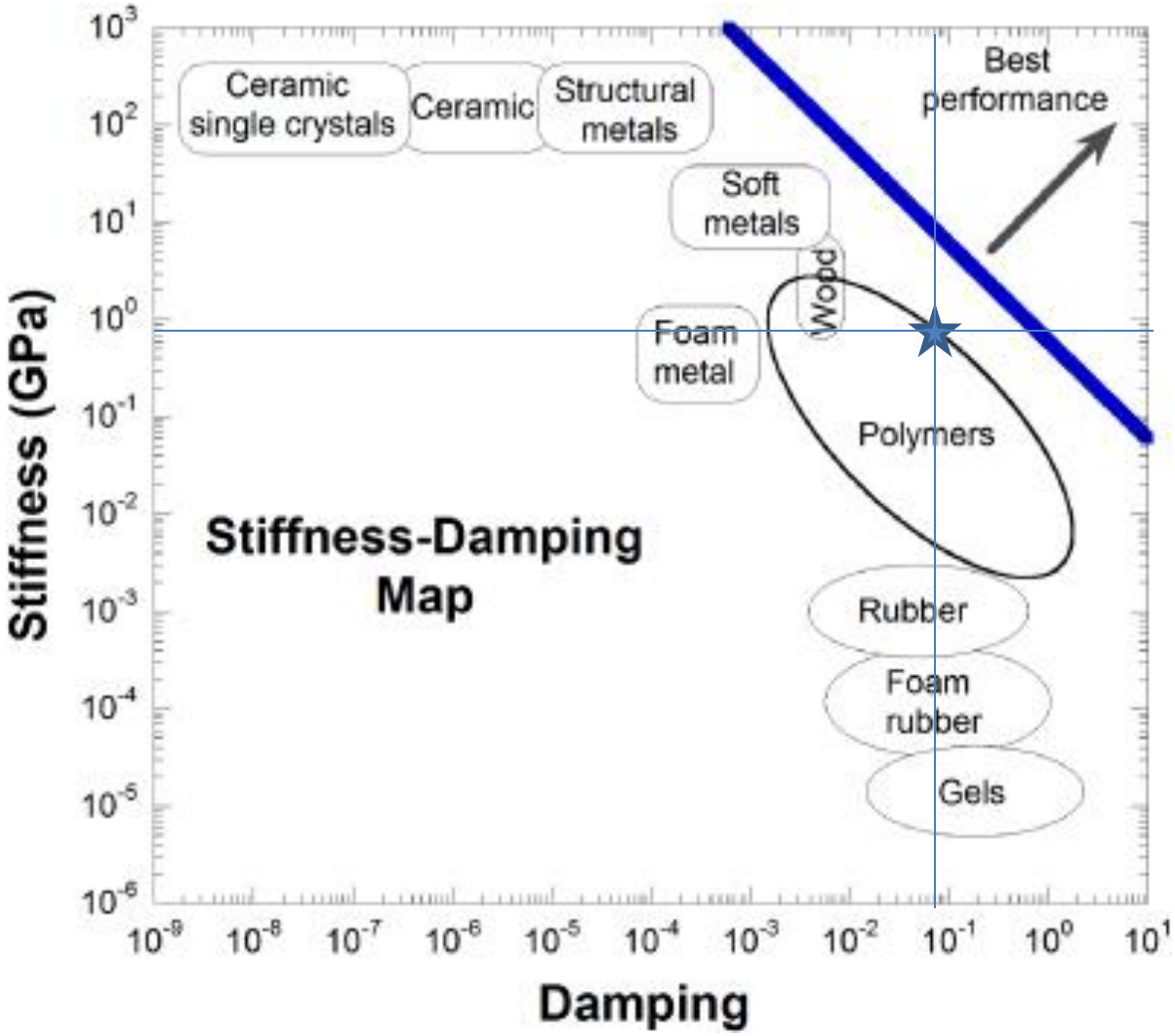
G6-Impact™: Graphene Thermoplastic Composites for Vibration Damping: Dynamic Mechanical Analysis (DMA)



G6-Impact™: Graphene Thermoplastic Composites for Vibration Damping: Dynamic Mechanical Analysis (DMA)



G6-Impact™: Graphene Thermoplastic Composites for Vibration Damping: Dynamic Mechanical Analysis (DMA)

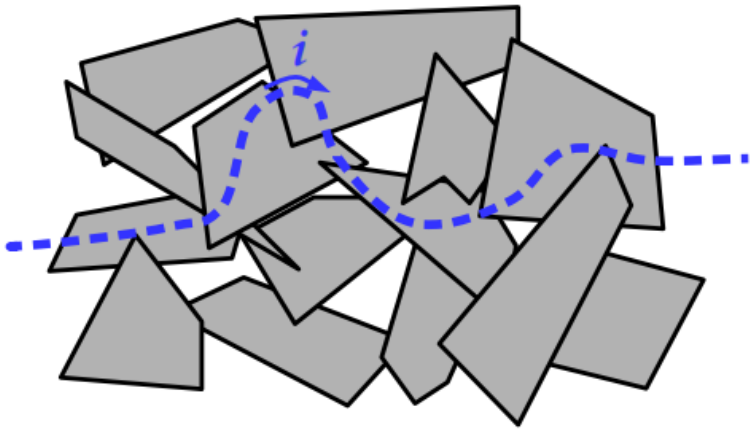


G6-Impact™: Graphene Composites for Vibration Damping

Targeted towards engineers and professional 3D printer users working in automotive, optics construction, robotics, or aerospace industry.

Application example: 3D Printed vibration damping support for the fiber laser platform

Conductive Graphene Polymers



Graphene platelets, when added to a polymer matrix, form a conductive network

- Low percolation threshold (0.5%)
- High in-plane conductivity
- Chemical inertness

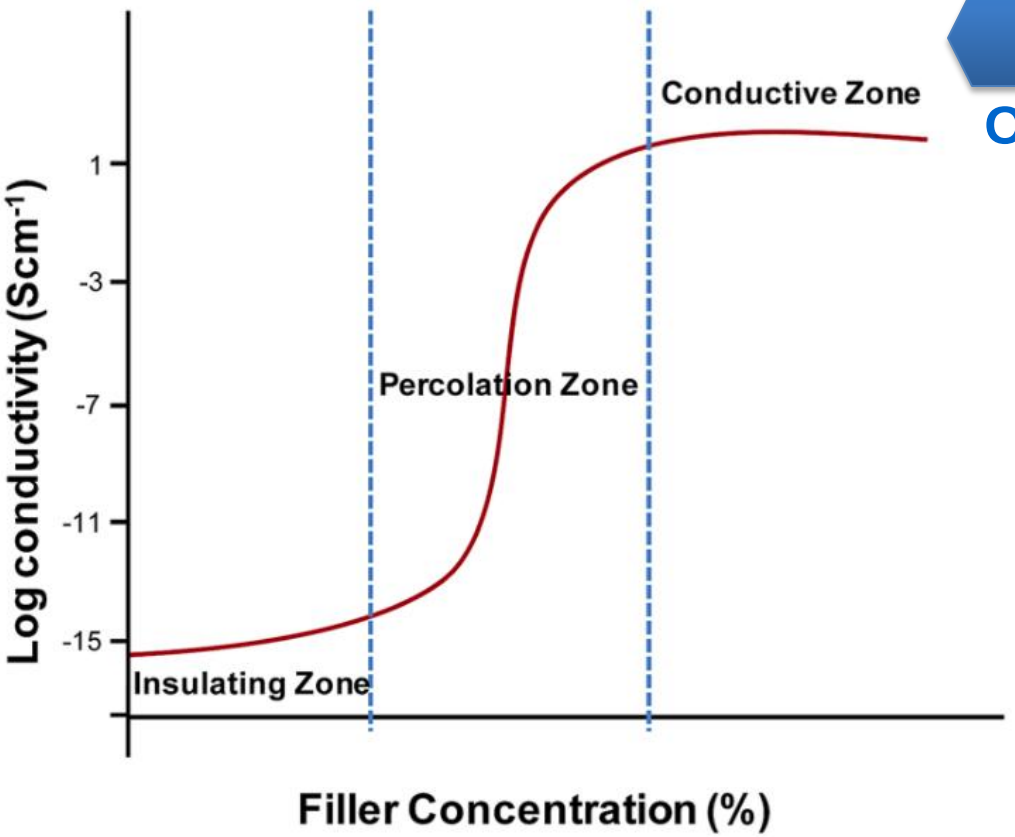
Conductive hybrid graphene composites

Resins

- PLA -3D printing material 0.6 Ωxcm
- TPU - Flexible 0.5 Ωxcm
- PS 0.1 Ωxcm

0.5 Ωxcm = 200 S/m =2 S/m= 0.005 Ωxm

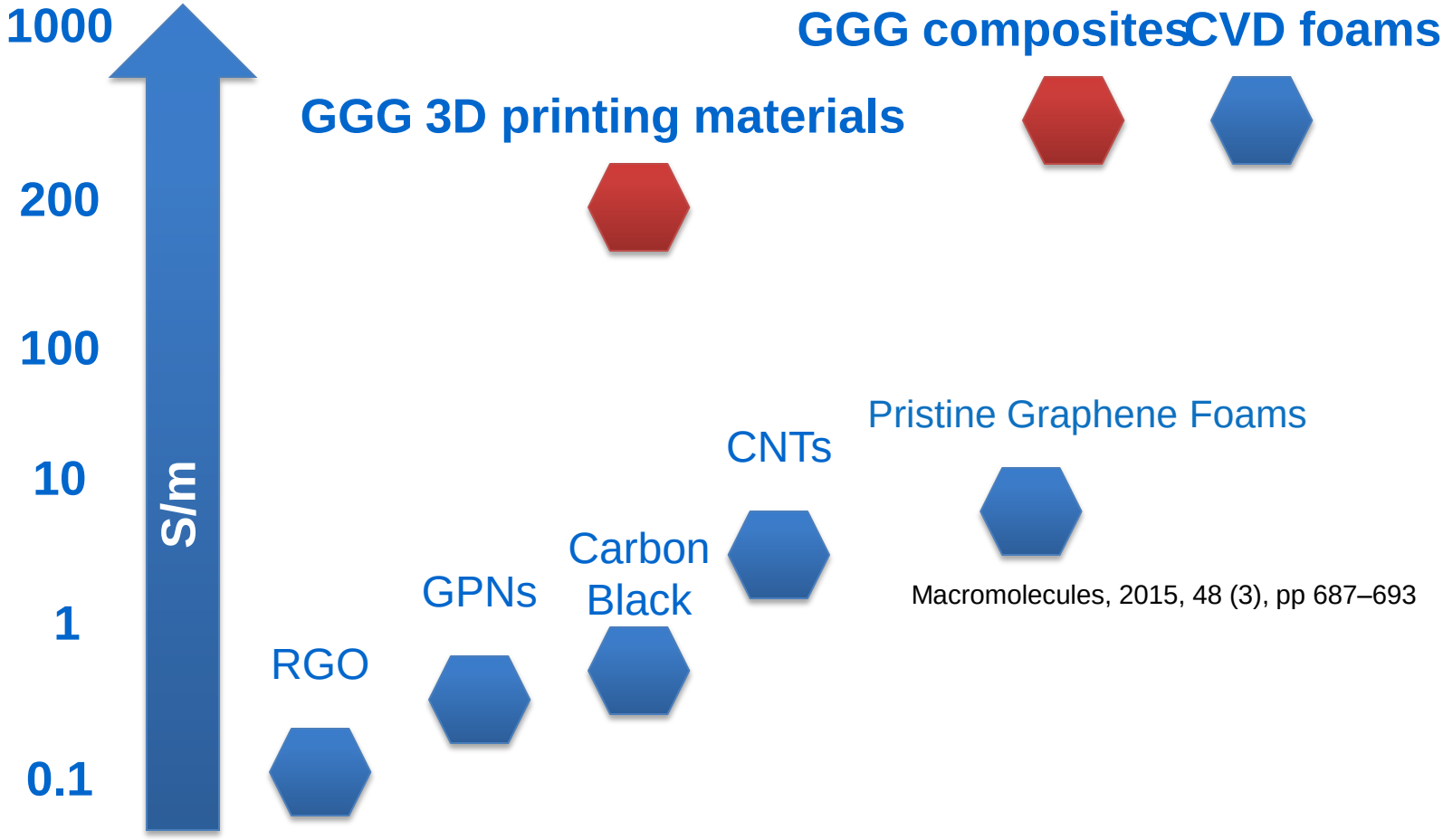
Conductivity of Plastics



Our materials

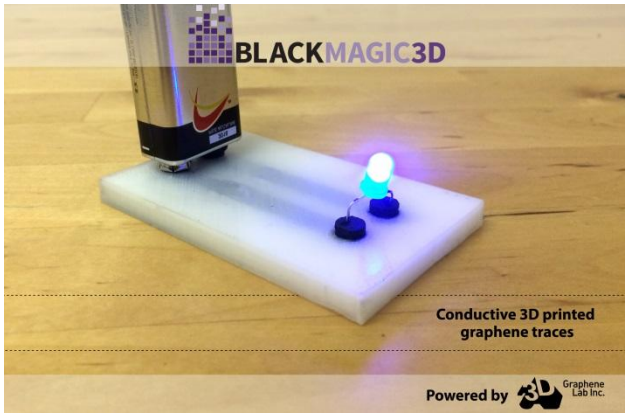
0.5Ωxcm = 200 S/m = 0.005 Ωxm= 2 S/cm

Electrically Conductive Plastics



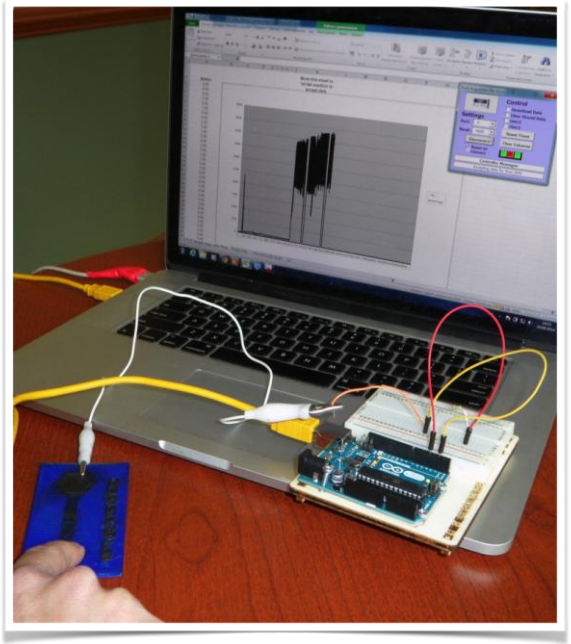
0.5Ωxcm = 200 S/m = 0.005 Ωxm= 2 S/cm

Conductive Graphene Filament

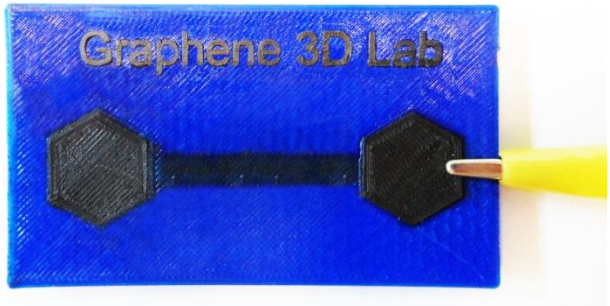


Applications of Conductive Filaments

- Three dimensional circuitry
- Sensors
- Electromagnetic Shielding
- Antennas
- Electrodes

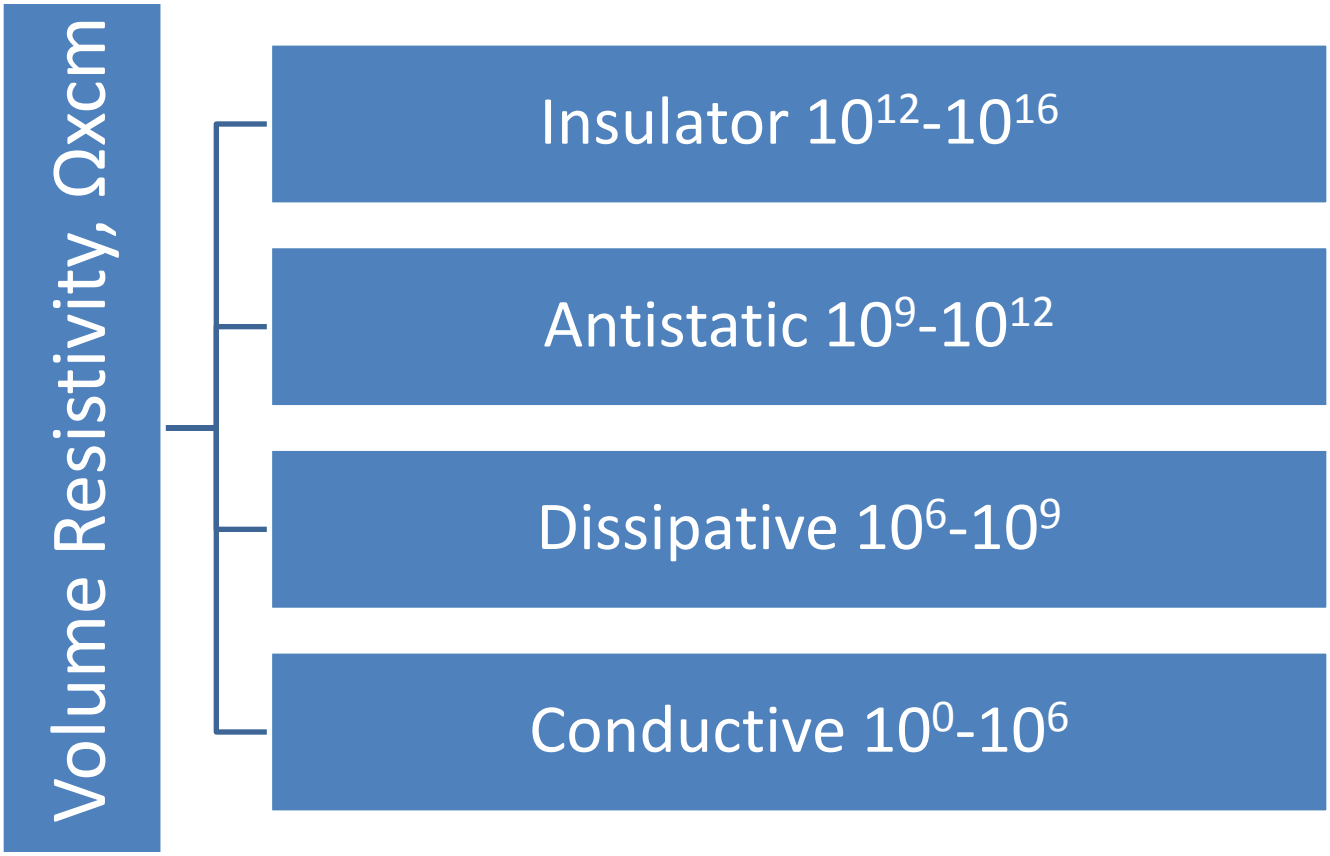


Conductive FDM filaments allows combining insulating and conductive parts in 3D-printed object



Multi touch displays

Conductivity of Plastics



Graphene Conductive Filament below 1 Ωxcm

Contact Information

Website: www.graphene3Dlab.com
Phone: (631) 405-5116
Email: info@graphene3Dlab.com

Graphene 3D Lab
4603 Middle Country Rd Suite 111
Calverton NY 11933

R&D Materials

GRAPHENE SUPERMARKET

Materials for 3D Printing

BLACKMAGIC3D

Graphene 3D Lab Inc.

Graphene Lab Inc.

Thank you for your attention!

Dr. Elena Polyakova, CEO