

You will create what you focus on.

the

**FUTURE**

is made of

**GRAPHENE**

**2D TECH**

**USA**

2D Tech USA® NANO AND 2D MATERIALS

2D TECH  
USA

2D TECH USA

Representing Tomorrow's Technologies Today

In this pursuit for emerging innovation: we must be SCIENTIFICALLY literate.

[https://www.youtube.com/watch?v=2WgvXuJz64&feature=emb\\_logo](https://www.youtube.com/watch?v=2WgvXuJz64&feature=emb_logo)

Patrick J. Abbott  
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Patrick@2DHumanitarian.com

2D Materials  
3D bio printing  
Abrasives & nano polishes  
Adhesives & Tapes  
Advanced Materials  
Aerospace & Aircraft

Maintenance Filtration  
Molecular biology  
Nano Technology  
NASA support (SpaceX/Boeing/LM)  
Patient Monitoring Systems



2D TECH  
USA

Agriculture & farming  
Automotive  
Bio-Fuel  
Bio Sciences  
Coatings  
Composites  
Construction (HUD)  
Containment  
Devices  
Electronics  
EMR/EHR  
Energy  
Engineering & Design  
Entertainment  
E/V

Pharmaceuticals  
Power Storage and Conversion  
Production film & non-film  
Propulsion  
Skin & Wound Care  
Solar  
Specialty Chemicals  
Sports & Recreation  
Training & Development  
Transportation  
Waxes & polishes  
Wire & Cable  
Wind

SMART CITY TEAM  
2D Global Humanitarian

1176  
Registered  
Clients  
SPEED  
&  
EFFICIENCY  
DELIVERY  
=  
PROFIT

Food (nano)  
Lubricants  
Oil & Gas  
HazMat  
Human Genomics (PCX/CGX)  
Medical (supplies)  
Marketing  
Materials Facility Cleaning  
Maintenance coatings

COVID-19 SUPPORT:  
Antibody testing  
Biocides  
Sanitizers & disinfectant  
PCR/CLIA lab development  
DoD/DHS/CDC/FEMA/NIH/NIOSH

2D TECH USA, NANO & BIO SCIENCES

Recognized Leader in Disruptive, Emerging Advanced Materials

But you can't fire me, I am the MAN OF STEEL!



Graphene Man is 200 times stronger than STEEL!



SUPERMAN	GRAPHENE MAN
x HEAVY	✓ LIGHTER THAN AIR
x PAST IT	✓ HARDER THAN DIAMOND
x NOT HUUUUGE!	✓ SUPER CONDUCTOR



Lewis & Gouch  
2019

- **NAICS Code 424690-** Specialty Chemical wholesale and distribution
- **NAICS Code 541613-** Marketing “Professional, Scientific, and Technical Services” Sector
- **NAICS Code 621999-** Healthcare Technology provider
- **NAICS Code 541611-** Healthcare Consulting services.
- **NAICS Code 423450-** Merchant wholesale distribution of professional medical equipment, instruments, and supplies

• **Registered Government Mandate (RGM)**

- **Dun & Bradstreet D-U-N-S # 117537363**
- **SAM & CAGE codes upon request**
- **SAM Directory Registered**

• **Commercial and Government Entity (CAGE)**

- **Enterprise Sourcing, Medical, Contingency (ACH)**

• **Medical Science Liaison**

- **Defense Logistics Agency (DLA)**
- **USA Smart City Council member**
- **Customer Interaction Center (CIC)**
- **USA Technical Collaboration Counsel**
- **Direct contract API Key approved (GSA)**
- **Environmental Protection Agency (EPA)**
- **State of Texas Letter of Good Standing 2019**
- **Hazardous Materials Level 1 response certified**
- **Certified National Pharmaceutical Representative (CNPR)**
- **Certified member EPARTRADE International trade association**
- **Notary signing agent (Texas Gov't Code, Sec. 406.005) Bond VT688**
- **Health Insurance Portability and Accountability Act Certified (HIPAA)**
- **SEMA/AAPEX (Specialty Equipment Market Association) Member since 1999**
- **Healthcare Information and Management Systems Society Registered (HIMSS)**
- **General Lines Life, Accident, and HMO issued Texas Department of Insurance (TDI)**



[https://www.youtube.com/watch?time\\_continue=1&v=5ymyABeWvZM&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=1&v=5ymyABeWvZM&feature=emb_logo)



Once Imagined : Now Reality

In the constantly changing world of single & multi-dimensional material, there is no "one size fits all" option, nor a single source company to offer the full platform or product characterization.

With over 30 years of specialty chemicals technical, sales, marketing and distribution experience, 2D Tech USA can help your company navigate the over-whelming process for project assessment, product evaluation, testing, maximization, scale, cost, performance and reliable supply.

Spectators say this is "disruptive " we say "Transitional."

Our goal is to positively affect the world.

"Saving the world , one ATOM at a time..."

**2D TECH  
USA**

The

**FUTURE**

is made of

**NANO MATERIALS**

2D TECH  
USA

**2D TECH USA<sup>®</sup>** is a privately owned company focused on the rapid commercialization of NANO, CNT, and 2D/Graphene technologies.

The

**FUTURE**

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**NANO MATERIALS**

2D TECH  
USA

By creating partnerships with innovative companies and institutions, **2D TECH USA**® is helping to create next-generation composite materials and other applications.

TECHNICAL ACCESS

2D TECH  
USA

Solutions LLC Company

GLOBAL

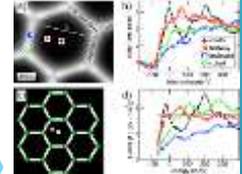


TIMING & OFFERING

Solutions LLC Company

GLOBAL

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USA



2D TECH  
USA

[www.2DTechUSA.com](http://www.2DTechUSA.com)

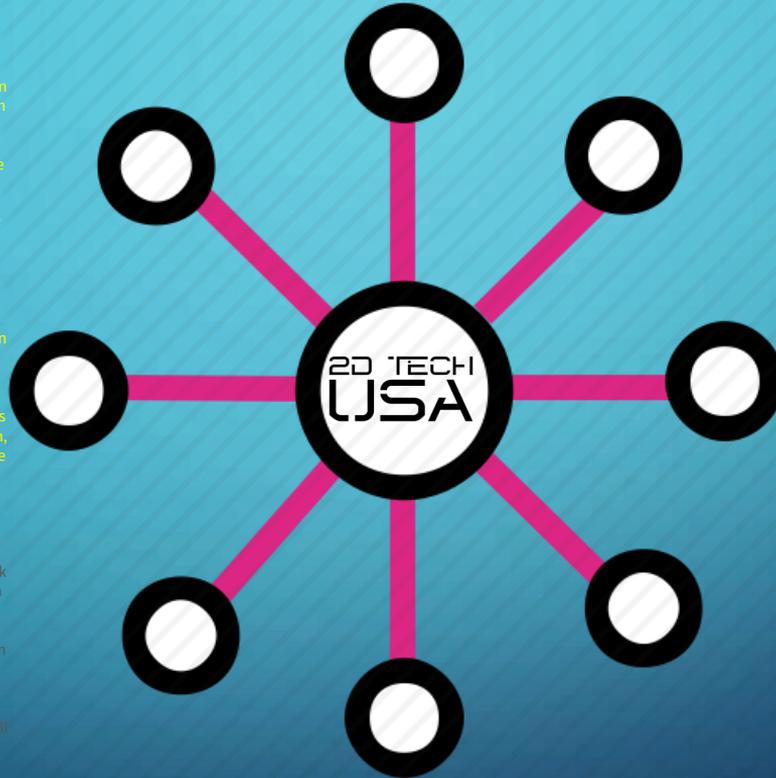
**Graphene**  
Graphene, a single-atom-thick hexagonal- or honeycomb-arranged sheet of carbon atoms, is considered the thinnest material known and stronger than steel. It is also pliable, transparent, and conductive of both heat and electricity. Commercialization efforts are already underway to make industrial-scale applications, including a conductive transparent electrode.

**ProCene and ProC Nano**  
Under raman spectroscopy instrumentation, these materials will test equivalent to, or as an enhanced version of, any graphite-based graphene material. High resolution microscopic evaluations reveal single-atom-thick hexagonal- or honeycomb-arranged cubical atoms. The slight difference from a true platelet orientation offers the end use client unique formulation options. It is also pliable, strong, light weight and conductive of both heat and electricity. This materials offers equivalent or better options in formulation design to graphene and is often referred to as "synthetic" graphene. The enhanced properties are achieved through a patented bio-mass conversion and manufacturing process. The patented process allows for extreme purity, carbon negative material, high quality and consistency. Commercialization efforts are already underway to make industrial-scale applications, with plants available to supply more than 1000 MTs per month in order to fill the awaiting 2D materials pipeline. Client benchmark and test evaluations of ProCene and ProC Nano in coatings, CRFP, construction, resins, epoxy, fluids, energy, and many additional end use applications have displayed exceptional performance.

**Silicene**  
A one atom-thick layer of silicon, silicene has graphene's electrical properties and could be used in silicon-based circuits to develop miniaturized electronic devices. Patrick Vogt of Berlin's Technical University, Germany, and Paola De Padova from the Istituto di Struttura della Materia in Italy isolated silicene through a process called simple vapor deposition to grow a one atom-thick silicon layer on a silver crystal surface.

**Silica Glass**  
David Muller and colleagues at the Kavli Institute at Cornell in New York discovered the thinnest preparation of glass ever made through electron microscopy. The silica glass, though 2D is an amorphous structure that's a few atomic-atom-thick and very stable and rigid, like bulk glass.

**Phosphorene**  
Single layers of black phosphorus, the most stable form of the element in open air, are being studied as a 2D electron-poor also known as p-type semiconductor by Peide Ye and others at Purdue University in Lafayette, IN.



**Molybdenum Disulfide (MoS2)**  
Silvery black and part of the family of layered metal chalcogenides, a MoS2 crystal, seen through optical microscopy and photoluminescence, consists of two molecular layers with part of one layer broken away. MoS2, being studied by Tony Heinz, PhD of the Departments of Physics and Electrical Engineering at Columbia University, considers MoS2 to be a promising lubricant as it forms into loose layers that readily slide from one another.

**Boron**  
Atomically flat boron, a naturally occurring mineral, is metallic and will transmit electrons with no resistance. Rice University's Chair of Engineering and Professor of Materials Science and Chemistry, Boris Yakobson, PhD is studying the material and found it to be a natural low-temperature superconductor that loses resistivity only in very cold conditions - between 10 and 20 Kelvin or about minus 430 degrees Fahrenheit.

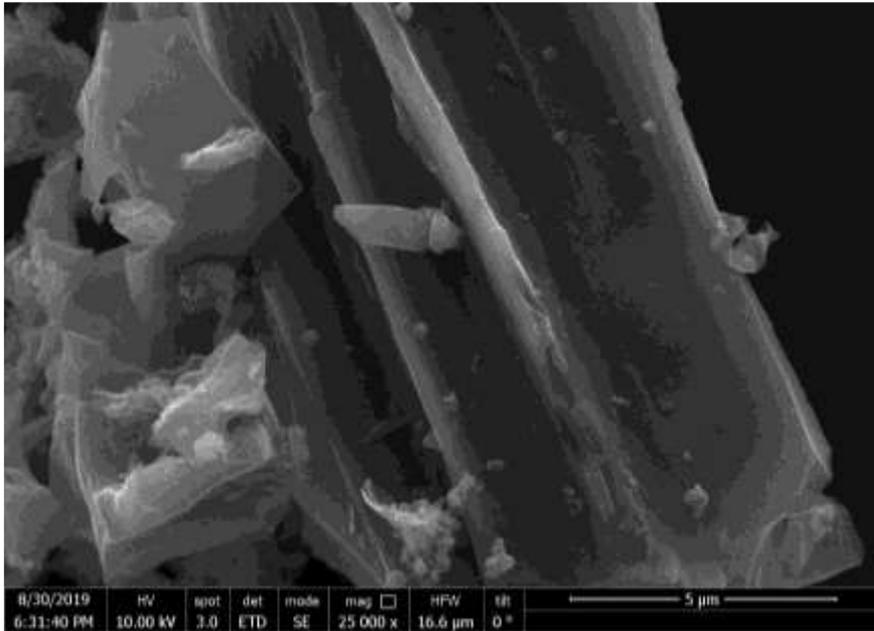
**Germanene**  
A one-atom thick honeycomb layer of germanene atoms is buckled in nature, as seen through scanning tunneling microscopy. An international team of researchers led by Guy Le Lay at France's Aix-Marseille University is exploring the material with the belief it could have a role in semiconductors.

**Stantene**  
Adding fluorine atoms to a single layer of tin makes stantene, a natural insulator that is believed to conduct electricity with 100% efficiency because the electricity moves along the outside edges of the material and not through its middle. Shoucheng Zhang, a physics professor at Stanford University's Institute for Materials and Energy Sciences (SIMES) is a lead researcher for this material.

**Kortrax®**  
Kortrax® has the same platform in the form of polyamide base as that of Quoral® with the addition of other polymers to improve the performance profile of chemical permeability and the oxygen transfer rate (OTR) of containers of HDPE. With the trademark of Baritainers®, Kortrax® made containers can safely transport solvent-based products such as cleaning solvents, household chemicals, wood preservatives, industrial chemicals, adhesives, agricultural chemicals and automotive additives.

Kortrax with CNT, Procene and Graphene

[https://www.youtube.com/watch?time\\_continue=1&v=OAN6qHP0Jio&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=1&v=OAN6qHP0Jio&feature=emb_logo)



Do clients know what they are using?

2D TECH  
USA

# GRAPHENE AND CNT ENHANCED THERMALLY CONDUCTIVE COATING



[https://www.youtube.com/watch?time\\_continue=3&v=rUhpCkp-4xM&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=3&v=rUhpCkp-4xM&feature=emb_logo)

[https://www.youtube.com/watch?time\\_continue=79&v=5Zt5rL\\_S9U8&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=79&v=5Zt5rL_S9U8&feature=emb_logo)

We have learned how used the thermally conductive properties to create an electrically "resistive" heat coating. **There are limitless opportunities for this technology, including the replacement of high maintenance heat tapes in harsh weather conditions and use in the Wind Energy industry as acid rain and degradation protection and de-icing, thermal management. We are working diligently to offer this technology in varied viscosity ratings as well as both solvent and water-based technology.**

# Graphene for 3D Printing/ Additive Manufacturing



2D TECH  
USA

- ✓ IMPROVE CORROSION PROTECTION PERFORMANCE WITHOUT COMPROMISING ADHESION OR CURING
- ✓ ENHANCE HARDNESS, DURABILITY, COMPRESSION, TENSILE STRENGTH, ELASTICITY, AND COVERAGE
- ✓ ELECTRICAL AND THERMAL CONDUCTIVITY FOR 3D PRINTING OF ELECTRONICS & BATTERIES

In 2017, the 3D Printing/ Additive Manufacturing industry, grew 21% to \$7.3 billion



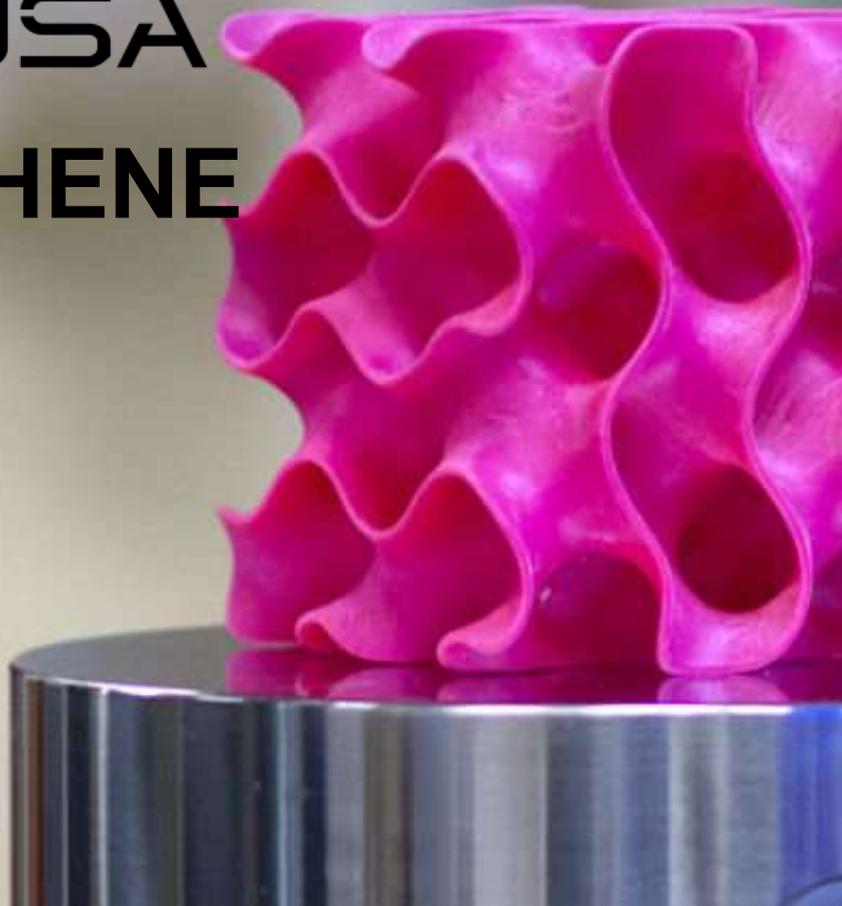
"...In just over two years, an astonishing 528,952 desktop 3D printers (or systems) are believed to have been sold. Wohlers estimates that revenues from the desktop segment were **well over \$500 million** in 2017. The total industry estimate of \$7.336 billion excludes internal investments from the likes of **Airbus, Adidas, Ford, Toyota, Stryker**, and hundreds of other companies, both large and small. A surprising number of the \$1-5 billion companies... are investing in AM R&D."

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USA

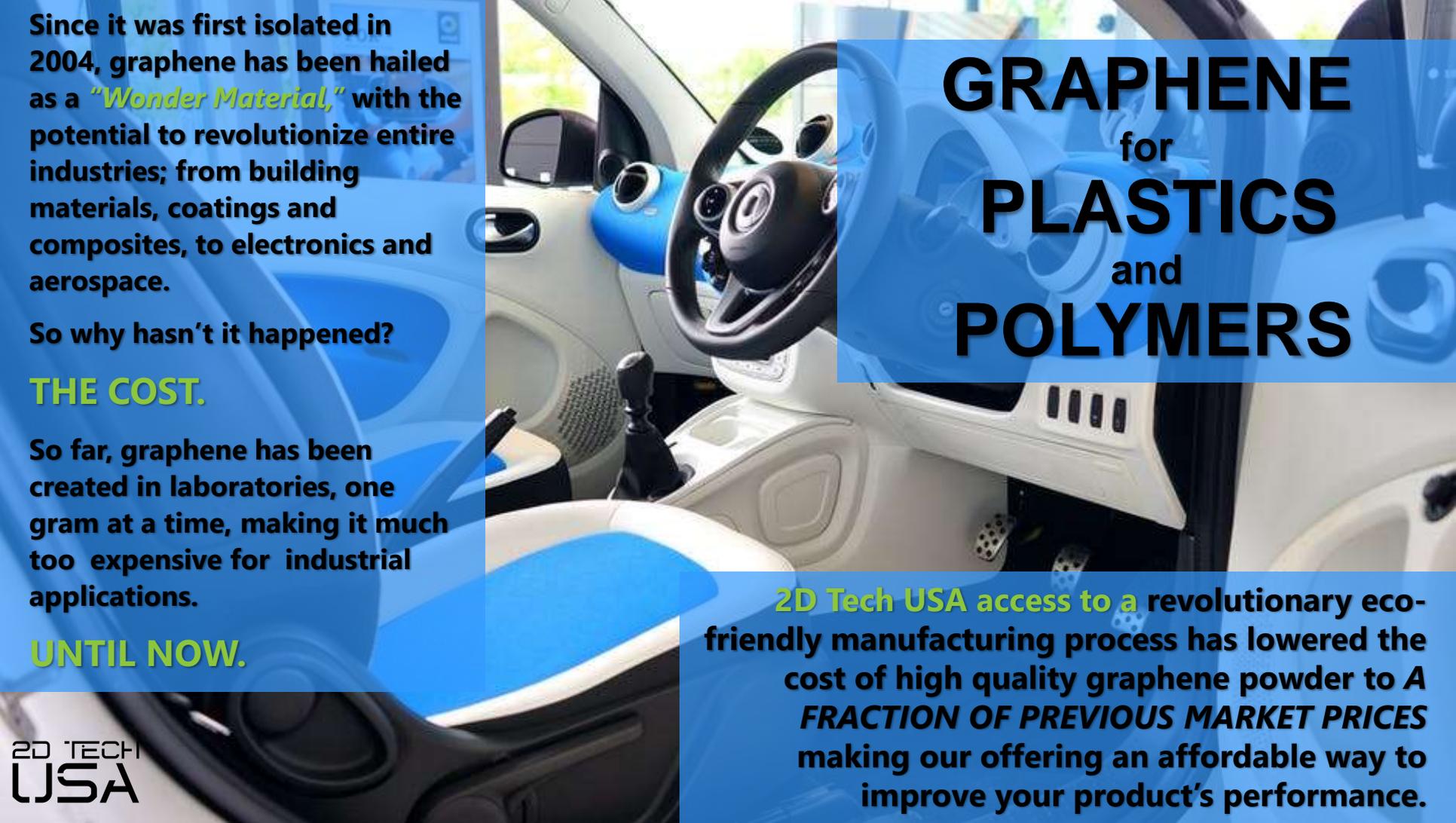
From: Wohlers Report 2018

# PROPERTIES OF GRAPHENE

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1. **Tensile strength: 18.85 million psi** (typical steel: 80,000 psi) (yield 36,000)
2. **Young's Modulus** (stiffness): **150 million psi** (typical steel: 32 Million) *Has the highest tensile strength of any material.*
3. **Thermal conductivity: 3000-5000 W/m/K** (Copper: 401 W/m/K)
4. **Electrical conductivity: greater than copper**
5. **Has the highest electron mobility of any material: 200,000 cm<sup>2</sup>/Vs.**
6. **Has the fastest moving electrons** in any material -  $\sim 10^6$  m/s
7. **Capacitance: 550 F/g**
8. **The thinnest material in the world**  $\pm$  only 0.34 nm thick
9. **Absorbs an extraordinary amount of light** per layer (2.3%)



Since it was first isolated in 2004, graphene has been hailed as a *"Wonder Material,"* with the potential to revolutionize entire industries; from building materials, coatings and composites, to electronics and aerospace.

So why hasn't it happened?

## THE COST.

So far, graphene has been created in laboratories, one gram at a time, making it much too expensive for industrial applications.

## UNTIL NOW.

# GRAPHENE for PLASTICS and POLYMERS

**2D Tech USA** access to a revolutionary eco-friendly manufacturing process has lowered the cost of high quality graphene powder to *A FRACTION OF PREVIOUS MARKET PRICES* making our offering an affordable way to improve your product's performance.

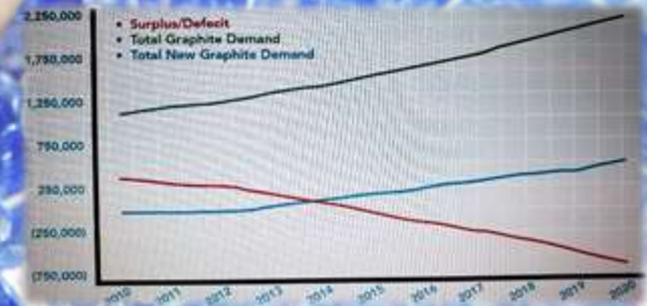
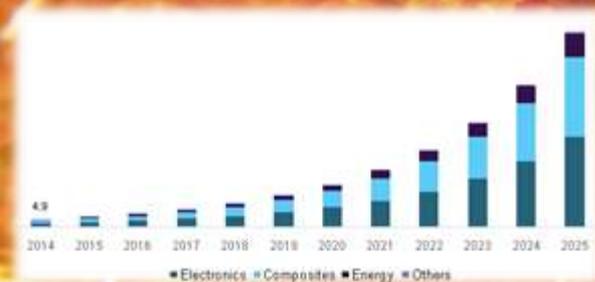
# Global Graphene Composites Market to Expand at a Stellar CAGR of 40% over 2017-2026

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*“The demand within the global market for “graphene” composites has been rising based on the expansive industrial uses of graphene...”*

*The total value of the global market for graphene composite was \$6.3 million in 2017, and is expected to increase by leaps and bounds...”*

<https://www.transparencymarketresearch.com>



# Rubber, SBR, Tires, Gaskets and Seals

The world of simple silicas have been replaced by the emerging use of advanced nanotechnology. [https://www.pneurama.com/en/rivista\\_articolo.php/TIRES-AND-NANOTECHNOLOGY-A-PERFECT-MATCH?ID=19124](https://www.pneurama.com/en/rivista_articolo.php/TIRES-AND-NANOTECHNOLOGY-A-PERFECT-MATCH?ID=19124)

We have worked diligently with several major rubber and tire companies to understand the everchanging needs and the use of nanotechnology, CNTs, and 2D materials.

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<https://youtu.be/bpiFYEfr-nl>

HRTEM compression test on a single IF-WS2 nanoparticle".

20 nm

The project scope concentrates on the investigation of **crankcase oils for diesel engines** and **greases for ball bearings applications** under high heat and pressure.

The particles selected for engine oils made of xGnP and are produced with a low cost and scalable wet chemistry synthesis based on polyol. Many efforts were devoted to the effective and stable dispersion of the solid phase into the final fully formulated lubricant. The nano-lubricant displayed reduced coefficient of friction with respect to a traditional lubricant in laboratory tribological tests.

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NASA MSFC Materials & Process Development  
Next-Generation Flexible Sensor Platforms

First Generation Personal CO<sub>2</sub> Monitor

DRAGON

Flexible Sensor Platform with High-Speed BLE Communications with personal transmitter & respiratory sensors

F9

Develop a flexible and conformal skin-attached optical sensor platform for medical monitoring. Prototypes based on scalable build processes for a well-funded medical start-up. The current rigid board version was hand-assembled which was not scalable for manufacturing. Redesign of sensing module and electronics as separate components allowed for optimized prices and electronics.

A highly complex build of the sensor modules required design and testing of assembly fixtures that enabled a fully automated build process.

Corrected hardware and firmware errors from the rigid-build prototypes.

Engineering sample delivery scheduled for December 2018.

Requirements of development included battery and wireless charging coil integration and process automation.

SPACEX

[https://www.youtube.com/watch?time\\_continue=2&v=22BXPLkynw&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=2&v=22BXPLkynw&feature=emb_logo)

2D Tech USA

2D TECH  
USA

PRESENTING  
TOMORROW'S  
TECHNOLOGY  
TODAY

# In times of crisis:

In 2009, work with SAP (super absorbent polymers) and certain single and multi-dimensional materials yielded the birth of the Inflatable Barrier Control System (IBCS).

Some refer to this process as the "sandless sandbag". The ability to offer a less intensive, less manual labor dependent, less resource required, lighter, faster and more protective interlocking mechanism has the potential to save lives and property.

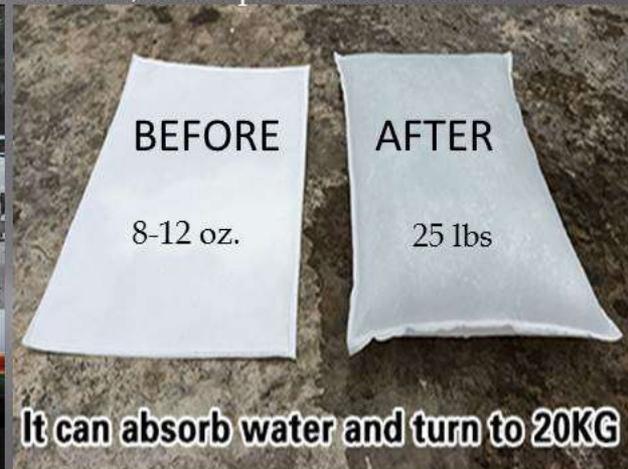


Offering speed and agility, this technology answers the call.

Registered Sodium Polyacrylate CAS # 9003-04-7

# WE CAN HELP!

Faster, easier, more efficient, less logistics, less effort, better protection- **READY NOW!**



Inflatable Bags vs. Traditional Sandbags		
	Our Products	Sandbags
Easy to store	✓	✗
Can be vacuumed-packed	✓	✗
Thousands can be quickly transported in a van	✓	✗
Lightweight before they are used	✓	✗
Can be stored for a long time	✓	✗
Can be expanded at scene of a flood	✓	✗
Can be stored in small depots	✓	✗
Environmentally friendly	✓	✗

Inflatable sandbag uses a degradable SAP (super absorbent polymer) to absorb water, then block it.

Delivered as a flat one-pound sack, they absorb up to 45 pounds of fresh water in five minutes, forming a dense gel that blocks and redirects water, while forming to each other or adjacent structures for a tighter fit than traditional sandbags. We use an environmentally friendly SAP (super absorbent polymer) for efficient performance.

Because they are stored dry, they are cleaner, lighter, more effective and easier to use in the places and times when sandbags are most needed.

[https://www.youtube.com/watch?v=VMYtv\\_bKdFg&feature=emb\\_logo](https://www.youtube.com/watch?v=VMYtv_bKdFg&feature=emb_logo)

the  
**FUTURE**  
is made of  
**GRAPHENE**

2D TECH  
**USA**

After years of "hype," graphene has reached a **tipping point** where the cost is low enough to be practical for industries.

**2D Tech USA** is the key to unlock your company's future.  
Low cost.  
High quality.  
Guaranteed.

CARBON-NEGATIVE POWDER BY THE TON

Tougher.  
Stronger.  
Lighter.

We have the technology.

Add **2D Tech USA<sup>®</sup> materials** to your plastics, compounds and polymers to increase their durability, water resistance, OTR, electrical conductivity and thermal profiles while reducing thickness and weight.

2D TECH  
USA

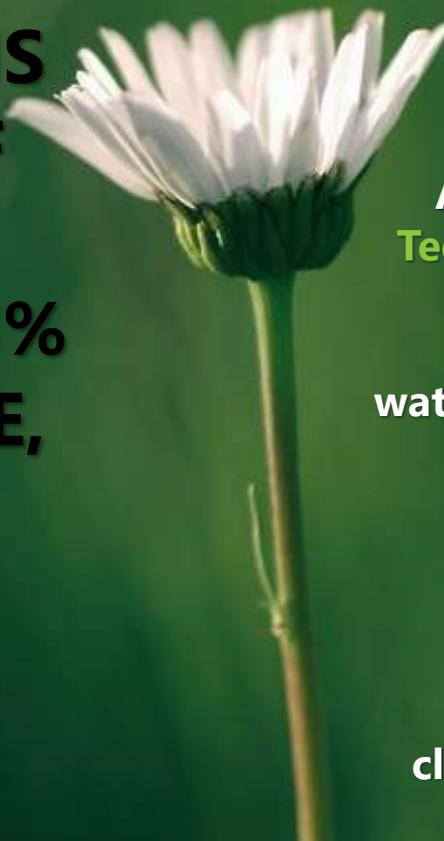
# Reduce your carbon footprint

**PLASTICS PRODUCTION IS RESPONSIBLE FOR 1% OF U.S. GREENHOUSE GAS (GHG) EMISSIONS AND 3% OF PRIMARY ENERGY USE, RESPECTIVELY.**

“Greenhouse gas mitigation for U.S. plastics production: energy first, feedstocks later”

I Daniel Posen<sup>1,2,4,5</sup>, Paulina Jaramillo<sup>1</sup>, Amy E Landis<sup>3</sup> and W Michael Griffin<sup>1</sup>  
Published 16 March 2017 • © 2017 IOP Publishing Ltd

[Environmental Research Letters](#) [Volume 12](#) [Number 3](#)



## 2D TECH USA

Add our cost-effective **2D Tech USA<sup>®</sup> materials** to your plastics and polymers to increase their durability, water resistance and improve thermal protection while reducing their carbon footprint.

Join **2D Tech USA** in our mission to create a better, cleaner world for everyone.



**2D Tech USA** is the perfect partner to help you develop your next generation of graphene enhanced plastic and polymer products.

With exclusive representation of high-quality graphene & procene powder by the ton, we can reliably supply your new products- from testing samples through scale up!



# 2D TECH USA

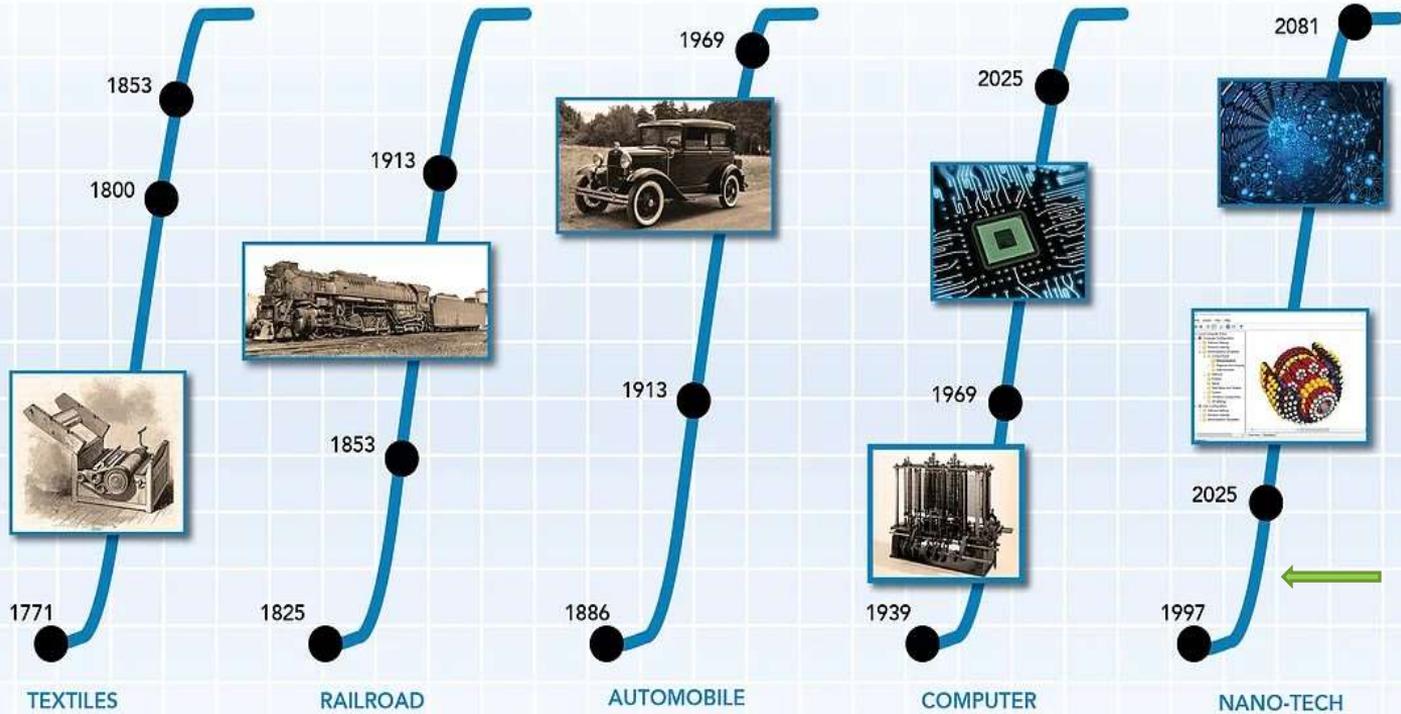
Everything we do at 2D Tech USA® is driven by the vision of our team to ***"heal the earth."***

By turning biomass into affordable graphene for industry, our access to a revolutionary ***carbon-negative*** manufacturing process is helping to ***create a better, cleaner world for everyone.***

***Our diverse offering of material options allow for a unique, sustainable differentiation from your competition.***

Where do you want to be?

## GROWTH INNOVATIONS



20 TECH  
USA

THANK YOU