
You will create what you focus on.
the
FUTURE
is made of
GRAPHENE
2D TECH
USA

Agenda

- 2D Tech USA Overview
- Nano and 2D Materials Introduction
- Transference of tech to Oil & Gas
- 2D Materials available in the space
- Specific applications overview
- Reduction of Carbon Footprint
- Close

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=2WgvXuJjz64&feature=emb_logo

Patrick J. Abbott
www.2DTechUSA.com
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
× HEAVY
× PAST IT
× NOT HUUUUGE!
GRAPHENE MAN
✓ LIGHTER THAN AIR
✓ HARDER THAN DIAMOND
✓ SUPER CONDUCTOR
PJA
Lewis & Gauch 2019

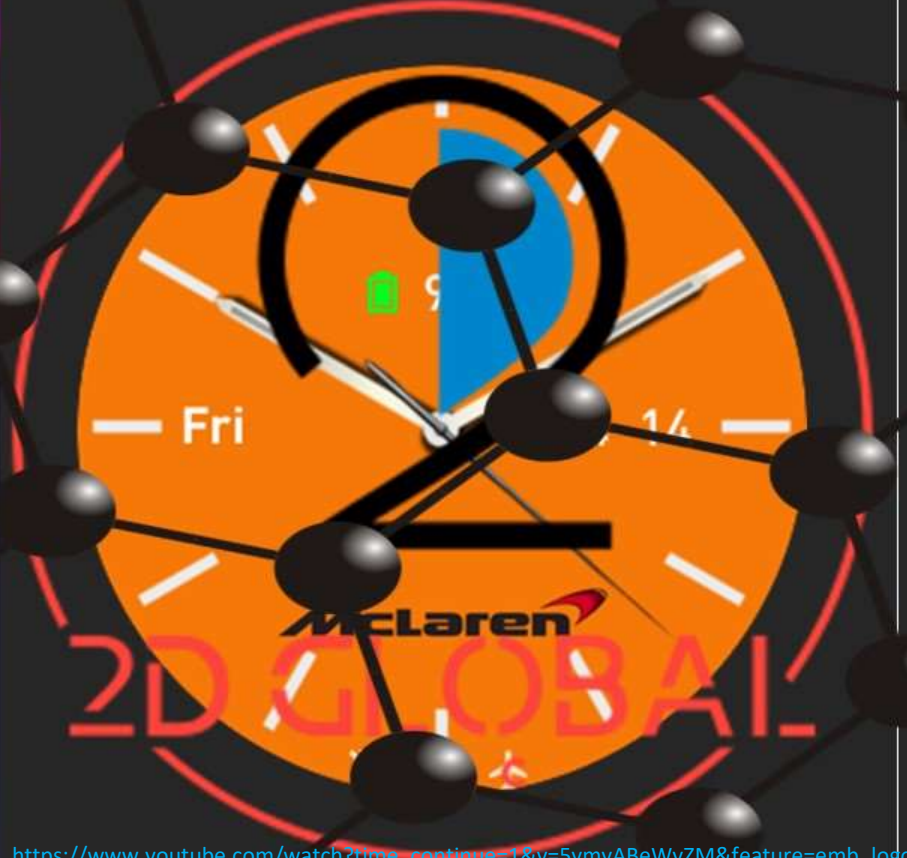
- **NAICS Code** 424690- Specialty Chemical wholesale and distribution
- **NAICS Code** 541613- Marketing “Professional, Scientific, and Technical Services” Sector
- **NAICS Code** 621999- Healthcare Technology provider
- **NAICS Code** 541611- Healthcare Consulting services.
- **NAICS Code** 423450-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

By creating partnerships with innovative companies and institutions, 2D TECH USA® is helping to create next-generation composite materials, fluids, friction agents, Quantum dot tracking and other applications.

WHAT IS GRAPHENE

- WONDER MATERIAL?
- FROM GRAPHITE
- 1 ATOM THICK
- CONDUCTS ELECTRICITY BETTER THAN SILVER
- CONDUCTS HEAT BETTER THAN DIAMOND
- STRONGER THAN STEEL
- EXTREMELY LIGHTWEIGHT
- ONLY ONE ELECTRON BOND REMOVED FROM THAT OF DIAMOND FACILITATING THE ORIENTATION AND USE OF THE FREE ELECTRON TO CREATE VARIED OF MATRICES.
- 2D TECH USA "THE SCI SHOW" VIDEO
- https://www.youtube.com/watch?time_continue=1&v=Mcg9_ML2mXY&feature=emb_logo

Graphene, in its pure or derivative form has been a topic of increasing importance in the scientific community for many years. However, its application in the oil and gas industry has only been popularized in the last few years, with the bulk of research taking place within the last ten years or less. Due to graphene's unique chemical, structural, electrical, and mechanical properties, it shows applicability for many areas within the oil and gas industry.

Areas of application may include (no limited to):

- Drilling
- Lubrication
- Desalination
- Filtration
- Anti-corrosion coatings
- Cementing
- Oil-water separation
- Spill cleanup (mitigation)
- Emulsion stabilization
- PIG tracking replacement.
- Many other applications







Cut away view looking down hole https://www.youtube.com/watch?v=05mSNRTU1Vw
https://www.youtube.com/watch?v=5faziGP_g7w
https://www.youtube.com/watch?v=ufYMgHa0d18 ***

Center shaft
Leading to drill mechanism
Peltier devices

Polymer based drill
Mud fluids
Interior shaft/metal
Exterior shaft/metal
Exterior wall of drill

Cartridge filter
60 inches in length
8 inches in diameter
40-100 filters per cartridge carriage
Mid-stream carriage can be up to 150 tons



End caps filled with an Epoxy adhesive potting compound, prefilled and pressed in a heat & Mechanical process.

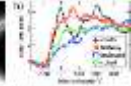
Challenges with:
Delamination
Separation
Durability
Chemical barrier

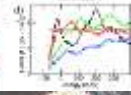
Material filled, pressed and cured approx 23 oz/end

Filter material deterioration

2D TECH USA

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

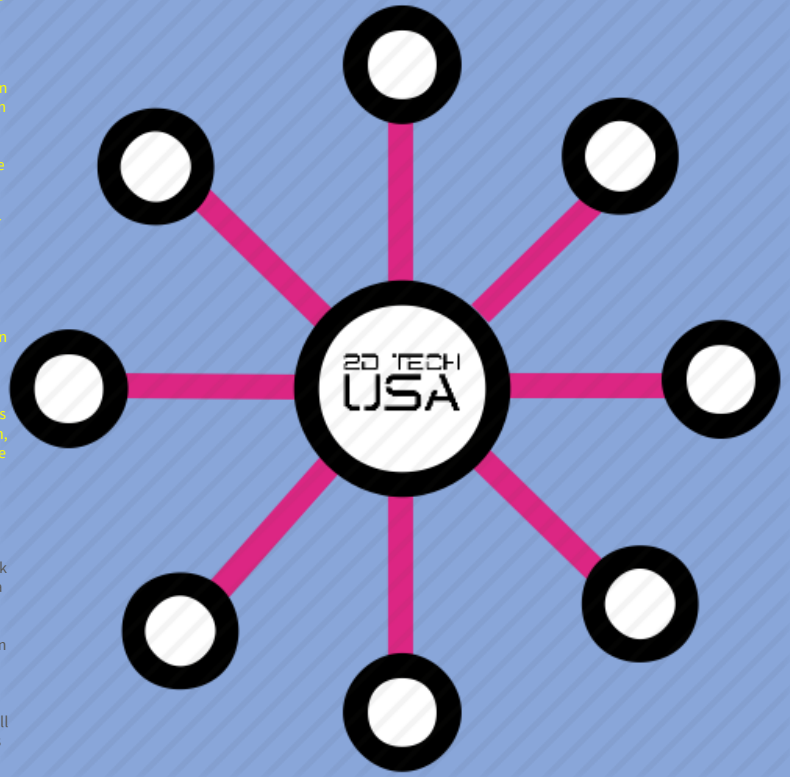
A one atom-thick layer of silicon, silicene has graphene's electrical properties and could be used in silicon-based circuits to develop miniaturized electronic devices. Patrick Vogt of Berlin's Technical University, Germany, and Paola De Padova from the Istituto di Struttura della Materia in Italy isolated 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 this thinnest preparation of glass ever made through electron microscopy. The silica glass though 2D is an amorphous structure that is a two-silicon-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 MoS2to 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 stanene, 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.

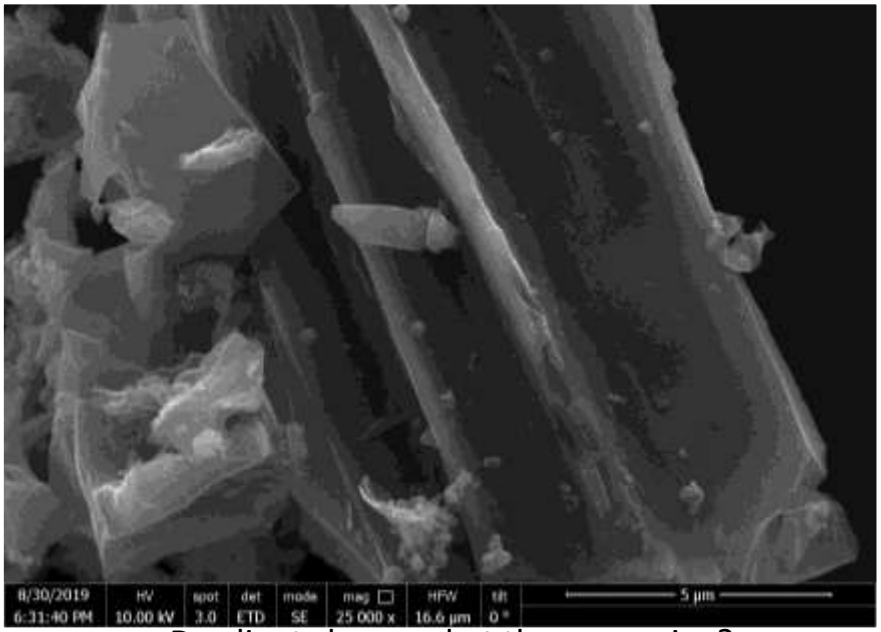
Kortrax®

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=Mcg9_ML2mXY&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

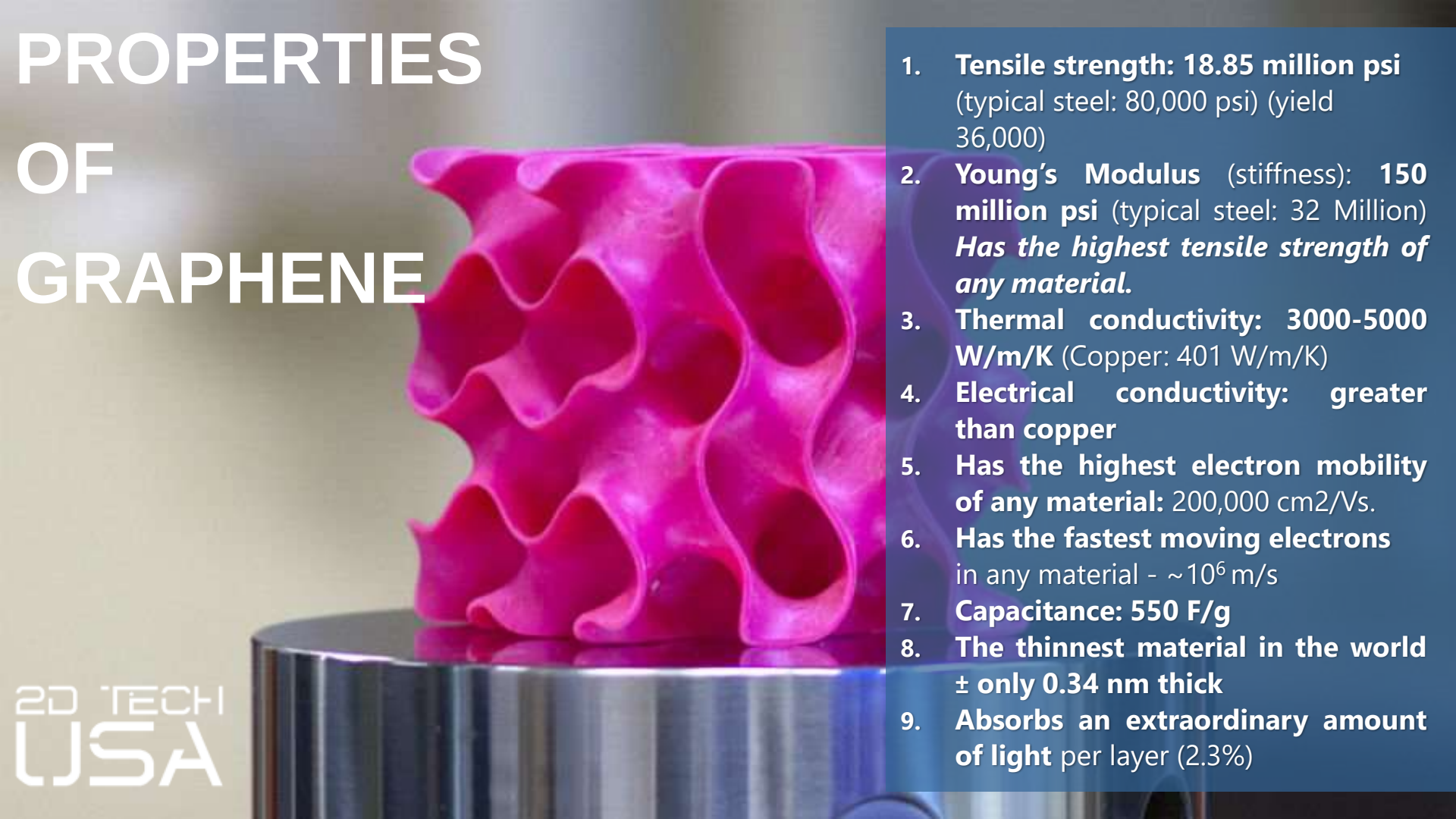
GRAPHENE AND CNT ENHANCED THERMALLY CONDUCTIVE COATING

https://www.youtube.com/watch?time_continue=3&v=rUHpCkp-4xM&feature=emb_logo

https://www.youtube.com/watch?time_continue=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.**

PROPERTIES OF GRAPHENE



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 cm2/Vs.
6. **Has the fastest moving electrons** in any material - ~10^6 m/s
7. **Capacitance: 550 F/g**
8. **The thinnest material in the world ± only 0.34 nm thick**
9. **Absorbs an extraordinary amount of light** per layer (2.3%)

2D TECH USA

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

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/bpjFYEfr-nI

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

https://www.youtube.com/watch?v=OAN6qHP0Jio&feature=emb_logo

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 lubricants 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.

2D TECH USA


NASA
NASA MSFC Materials & Process Development
Next-Generation Flexible Sensor Platforms
DRAGON
F9
SPACEX
2D Tech USA
2D TECH
USA
Presenting
Tomorrow's
Technology Today
https://www.youtube.com/watch?time_continue=2&v=22BXPLkyocw&feature=emb_logo

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 inter-locking mechanism has the potential to save lives and property.

American Red Cross

Offering speed and agility, this technology answers the call.

Registered Sodium Polyacrylate CAS # 9003-04-7

WE CAN HELP!

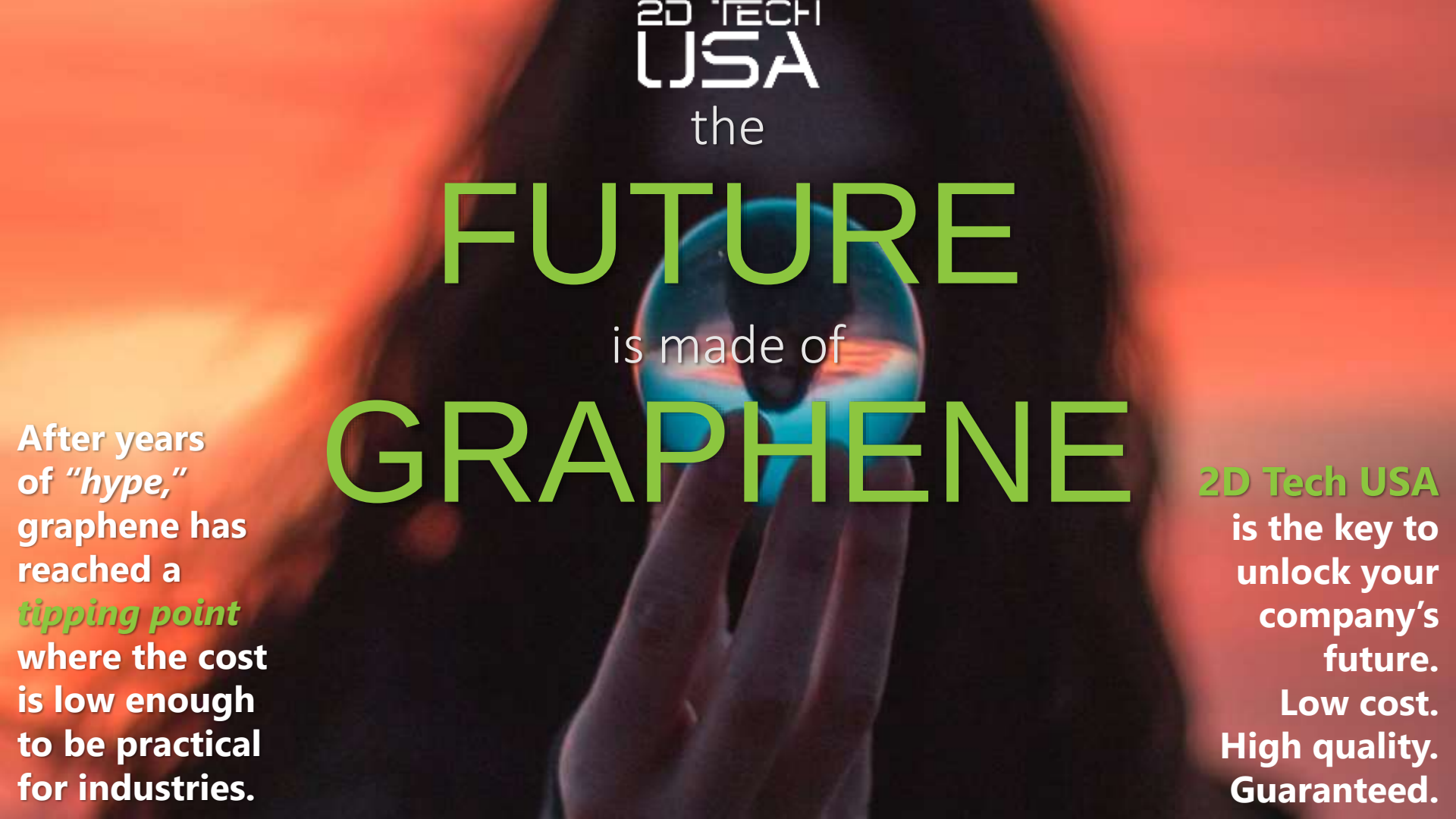
Faster, easier, more efficient, less logistics, less effort, better protection- READY NOW!

Inflatable 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


2D TECH
USA
the
FUTURE
is made of
GRAPHENE
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® 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

2D TECH USA

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[1,2,4,5], Paulina Jaramillo[1], Amy E Landis[3] and W Michael Griffin[1]
Published 16 March 2017 • © 2017 IOP Publishing Ltd

Environmental Research Letters, Volume 12, Number 3

Add our cost-effective 2D Tech USA® 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.

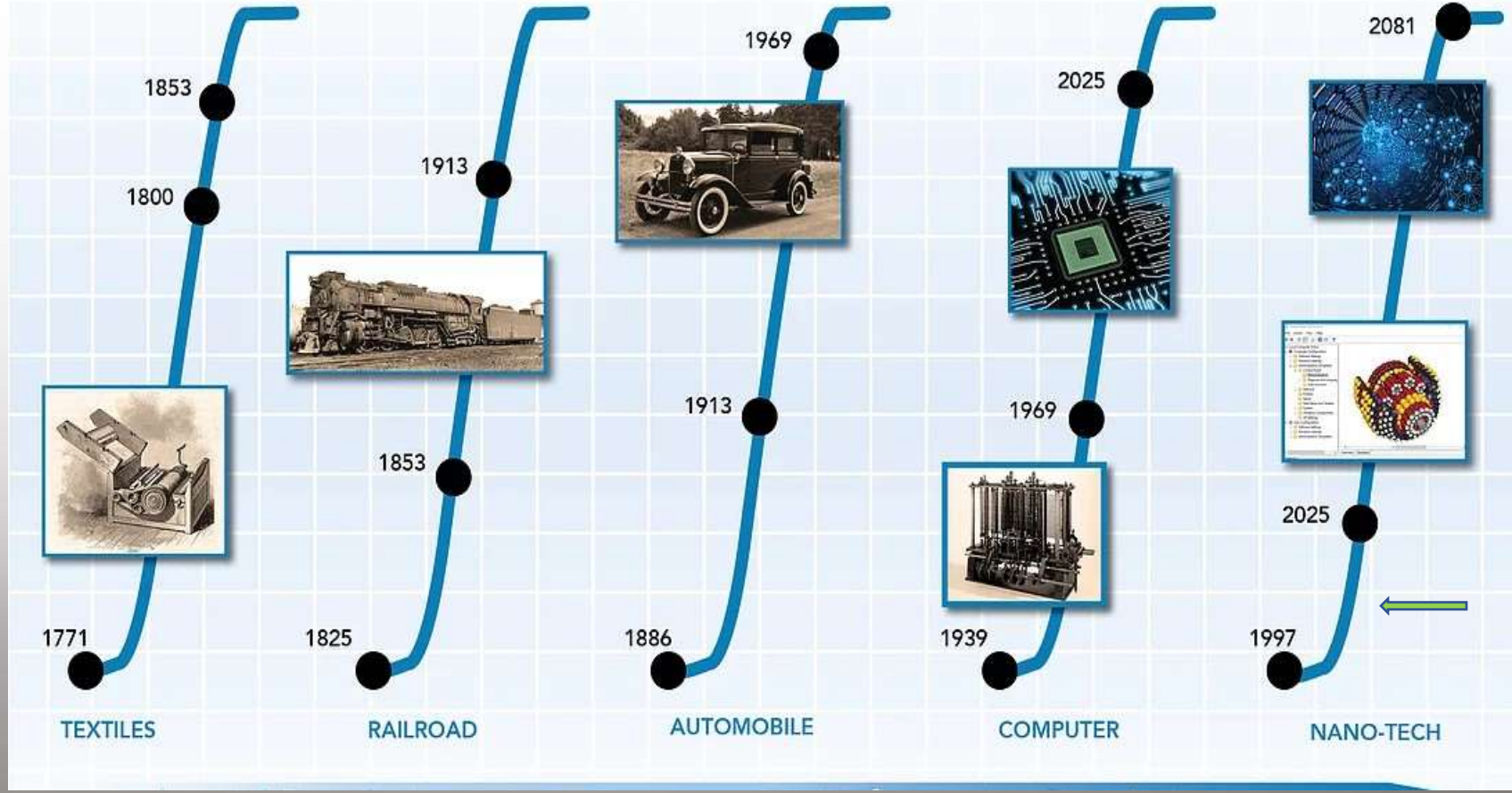
2D TECH USA

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.

GROWTH INNOVATIONS



2D TECH USA

THANK YOU