



GRAPHENE-XT

NEXT GENERATION MATERIAL

Graphene-XT: future is now!

Research and development of [eco-friendly nanomaterials](#)



LUBRICANT  
EXPO EUROPE



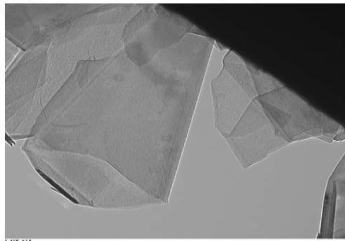
THE BEARING  
SHOW EUROPE

# The graphene properties



<http://www.physorg.com/news/177689867.html>

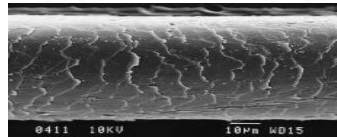
Graphite (3D)



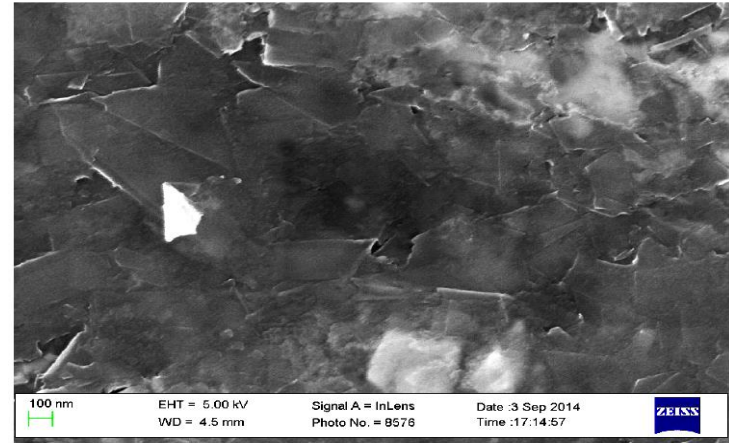
J Mater Sci (2008) 43:5092–5101

Graphene (2D)  
0,35 nanometre

Human hair ~80000 nm



- Stronger than steel, 200 times
- Thin and flexible
- Resistant to chemical attack
- Stable at high temperature and pressure
- Pure carbon-carbon structure non-reactive material

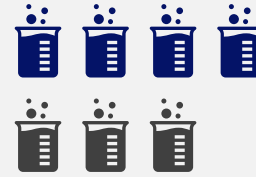


# GRAPHENE WAS DISCOVERED IN EU



## GRAPHENE FLAGSHIP

This project has received funding from the **European Union's H2020** under grant agreement n° 881603.



**4 of the 7 products** developed and marketed in the **Graphene Flagship** are from **Graphene-XT**

Flexible

Fast

Efficient

Graphene-XT is a leader in graphene application

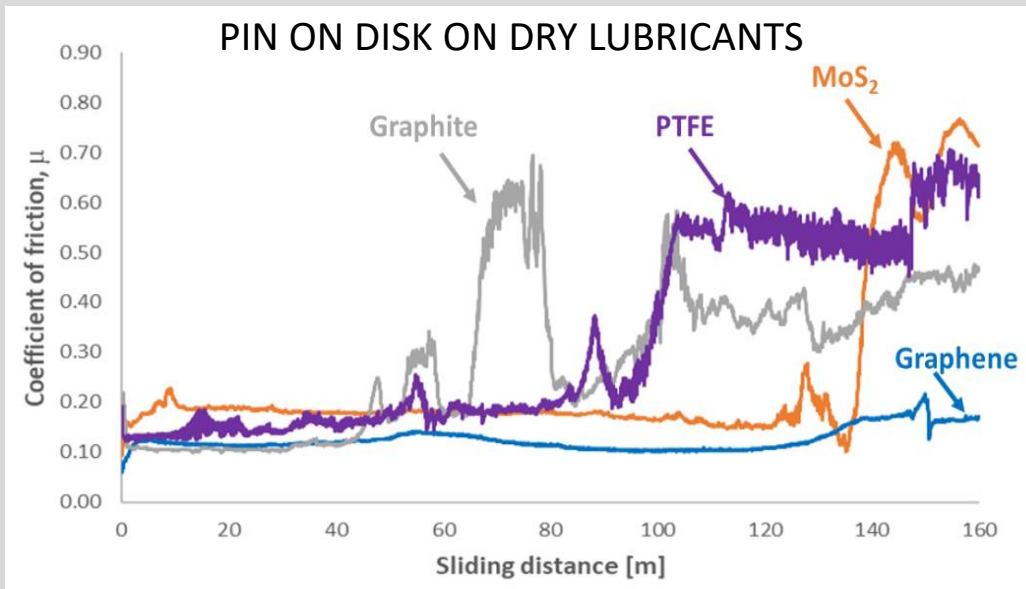


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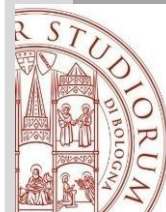
# GRAPHENE EMERGING TECHNOLOGIES

18K

scientific papers on graphene and lubrication on 2023



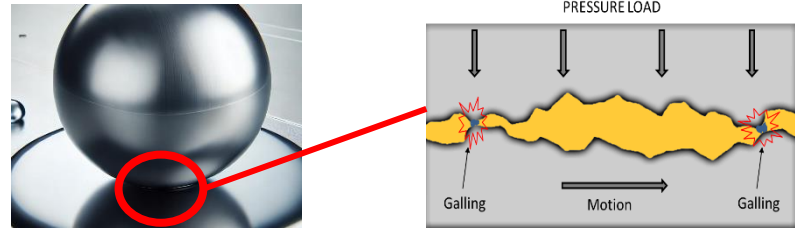
Graphene is a nanotechnology with **exceptional lubricating properties**



Prof C.Martini (UNIBO)

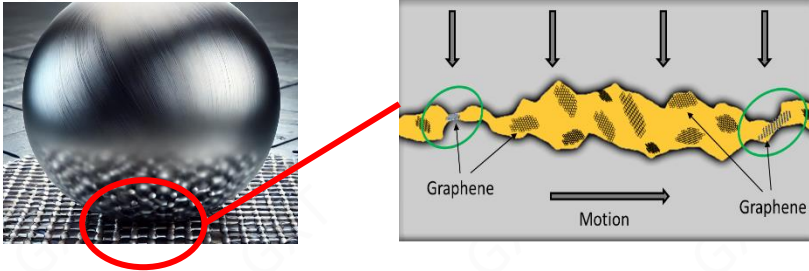


# WHY GRAPHENE



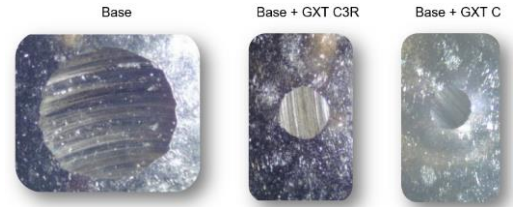
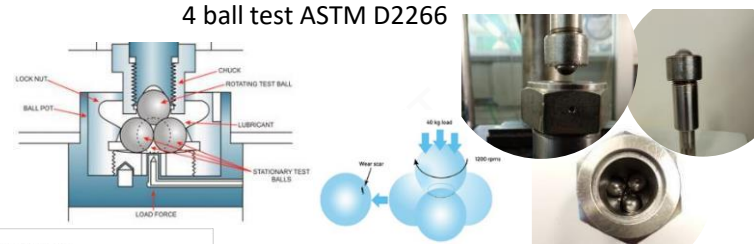
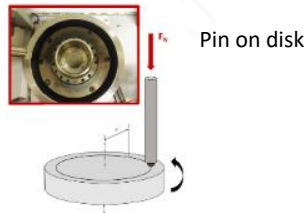
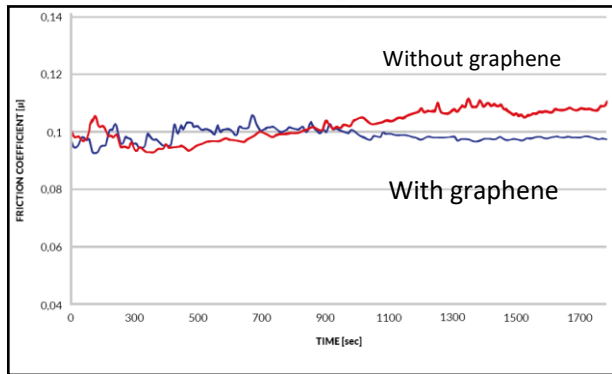
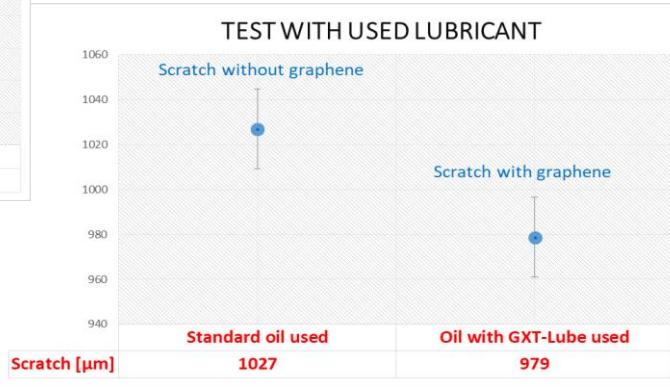
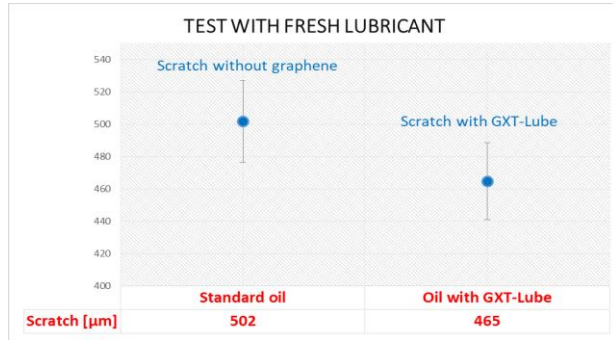
Under high load oil lubrication fail

Graphene create a pad of inert, impalpable material that prevents micro-welding of contact materials



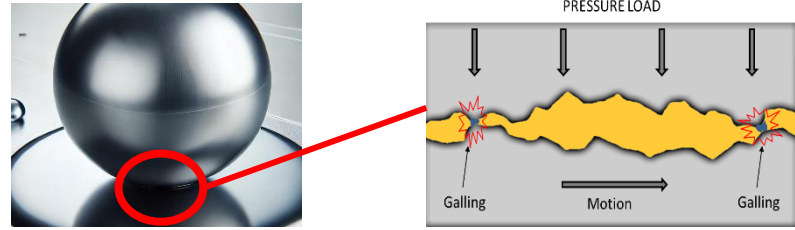
# Graphene as lube additives

Graphene protect surface from wear and tear



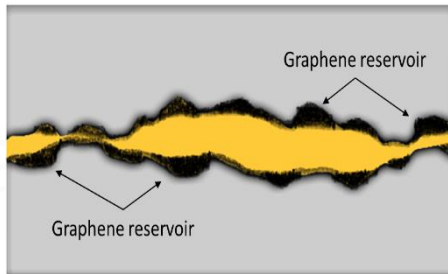
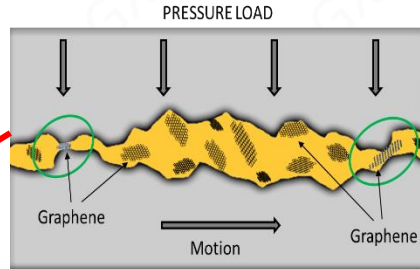
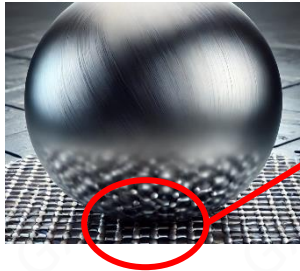
Graphene repair scratches

# WHY GRAPHENE



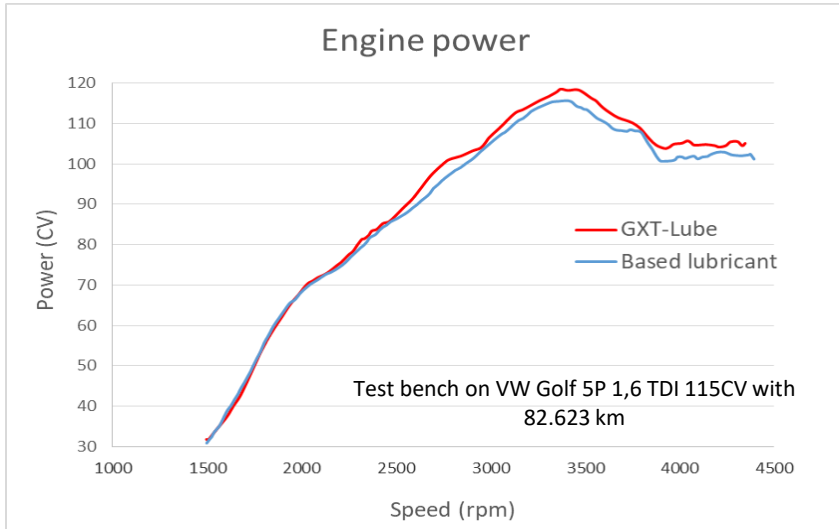
Under high load oil lubrication fail

Graphene create a pad of inert, impalpable material that prevents micro-welding of contact materials



- ✓ Equalises the surfaces
- ✓ Inert, even in harsh condition
- ✓ Highly stable at high temperature and pressure

# Graphene: more power and efficiency



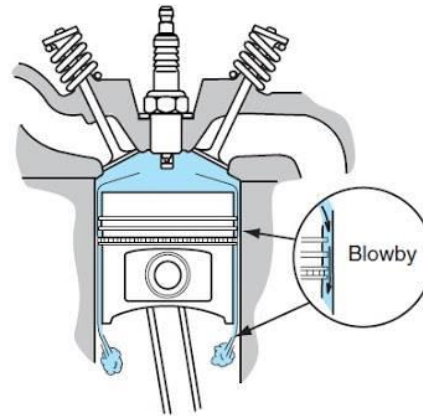
## VISCOSITY VARIATION (40°)

Standard lubricant

8,6 %

Lubricant with graphene

1,5 %



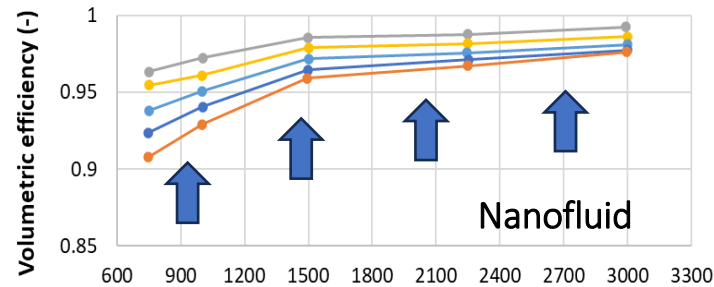
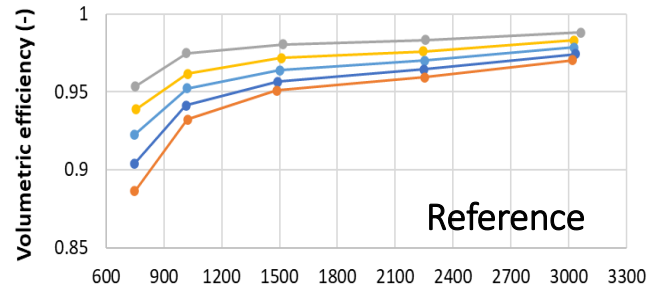
ACIDITY	TAN
T5W-40	1,9
T5W-40 + GXT-LUBE	1,6
T5W-40 AGED	3,6
T5W-40 + GXT-LUBE AGED	2,1

**FUEL SAVING**  
10% on industrial engine



# Graphene on hydraulic fluid

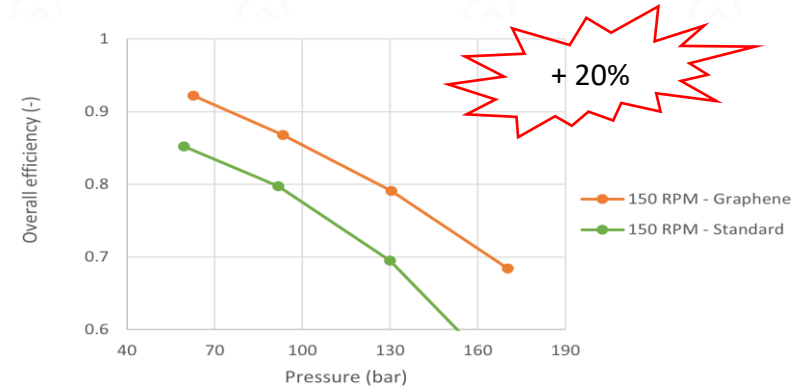
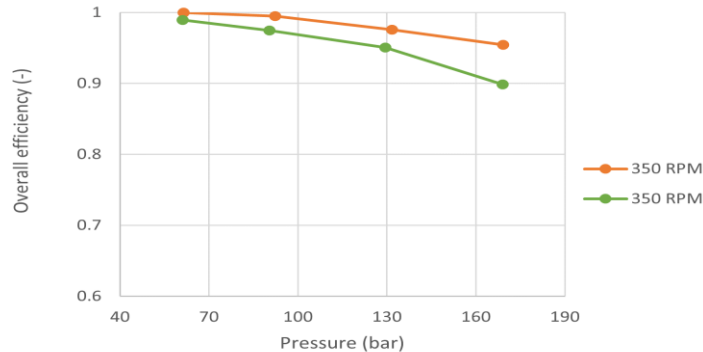
## Volumetric efficiency



- Efficiency is increased by nanofluids
- Higher graphene concentration results in higher efficiency
- Fluid bulk modulus is unvaried, thus leakage reduction

# Power fluid at higher efficiency

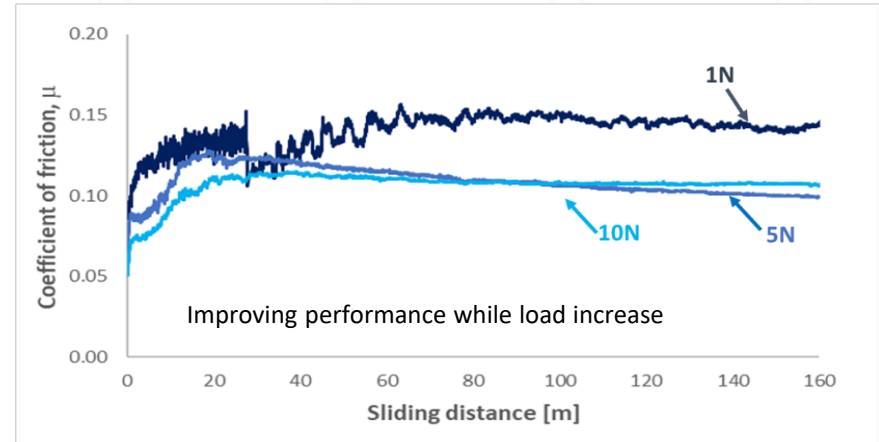
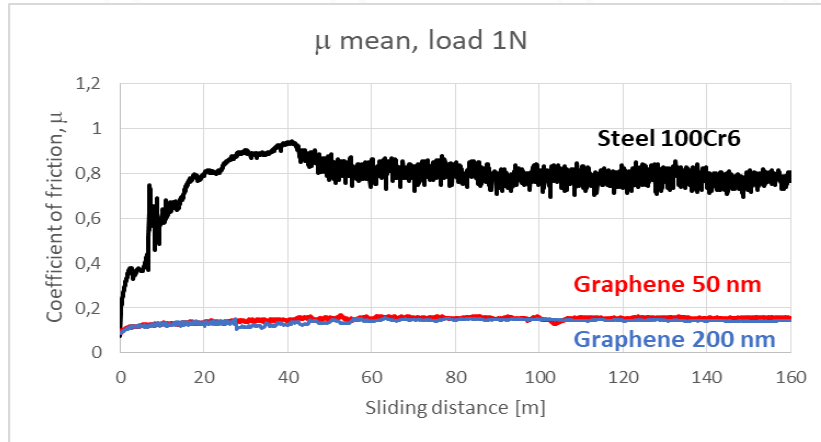
More power on wide range of speed and pressure



Graphene fluids help to extend the operating speed range of the pumps. Particularly interesting in the field of pump-controlled systems, providing **higher efficiency** in the low and very low speed-range

# Graphene as dry lubricant

- Graphene coating as dry to touch lubricant. It can be applied to any object and many substrate with a simple and continuous process
- It's a soft semi-permanent coating
- Is an electrical and thermal conductive coating



# Graphene coating



- Thickness from 0,01  $\mu\text{m}$  up to few micron to: metals, polymer, ceramics, glass, etc.
- Friction coefficient up to 0,05  $\mu$
- Soft coating with hardness of 3H (ASTM D 3363 – 00)
- Electrically conductive: from 5 ohm/sq till 100 kohm/sq
- Thermal conductive, higher than 50 W/m\*k
- Stable in a harsh condition: high temperature, aggressive chemicals, vacuum, high pressure



Copper coated with 200 nm of Tribo-Xt

EU's ban on PFAS (per & polyfluoroalkyl substances) is raising significant challenges in the industry. Our graphene technology will address this issue with its eco-friendly, water-based technology without toxic chemicals.

Looking to greener products our  
graphene could help you

50% CO<sub>2</sub> reduction in lubricant for metal working

121 B\$ world of lubricant market, massive saving in resources and GHG emission

# WHAT CAN BE DONE WITH GRAPHENE

## Concrete action to green transition with Graphene-XT

### ENGINE LUBRICANT

5% more power in your car, up to 30% fuel saving



Next generation of highly efficient lubrication: greener, nicer and safer.



### DRY LUBRICANT

dry to touch lubricant  
molding protection



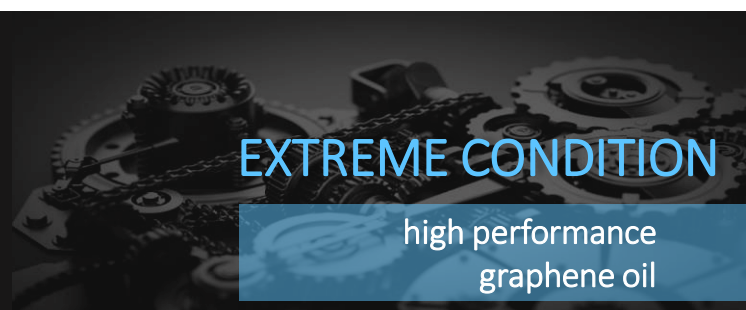
### BIKE LUBRICANT

less friction with  
cleaner bike



### EXTREME CONDITION

high performance  
graphene oil





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# GXT-Lube



## GRAPHENE FLAGSHIP



GXT-Lube increase power and reduce cost

Synthetic graphene-based additive for engine-oil. It provides anti-friction and anti-wear properties, it reduce blow-by and protects engine

# VISIT US AT BOOTH 234



## GRAPHENE-XT

NEXT GENERATION MATERIAL

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