
Sweden loves
Graphene


Special Diets
from lab to fab
Sweden loves Graphene


GRAPHENE WEEK
GRAPHENE WEEK 2023
TURN WONDER INTO ACTION
#GW2023
GRAPHENE WEEK
TURN
WONDER
TO
TION

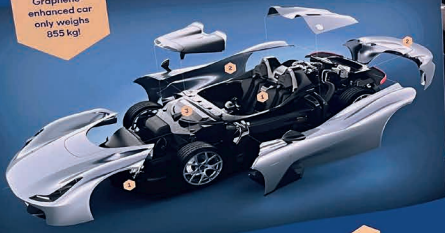
GRAPHENE
FLAGSHIP

GRAPHENE SPORTSCAR

Featuring graphene-enhanced body and fire-resistant interior

Manufactured by Dallara Automobili Spa, this car showcases components consisting of three kinds of carbon fibre composites with epoxy resin enhanced with graphene, leading to improved physical properties.

Graphene-enhanced car only weighs 855 kg!



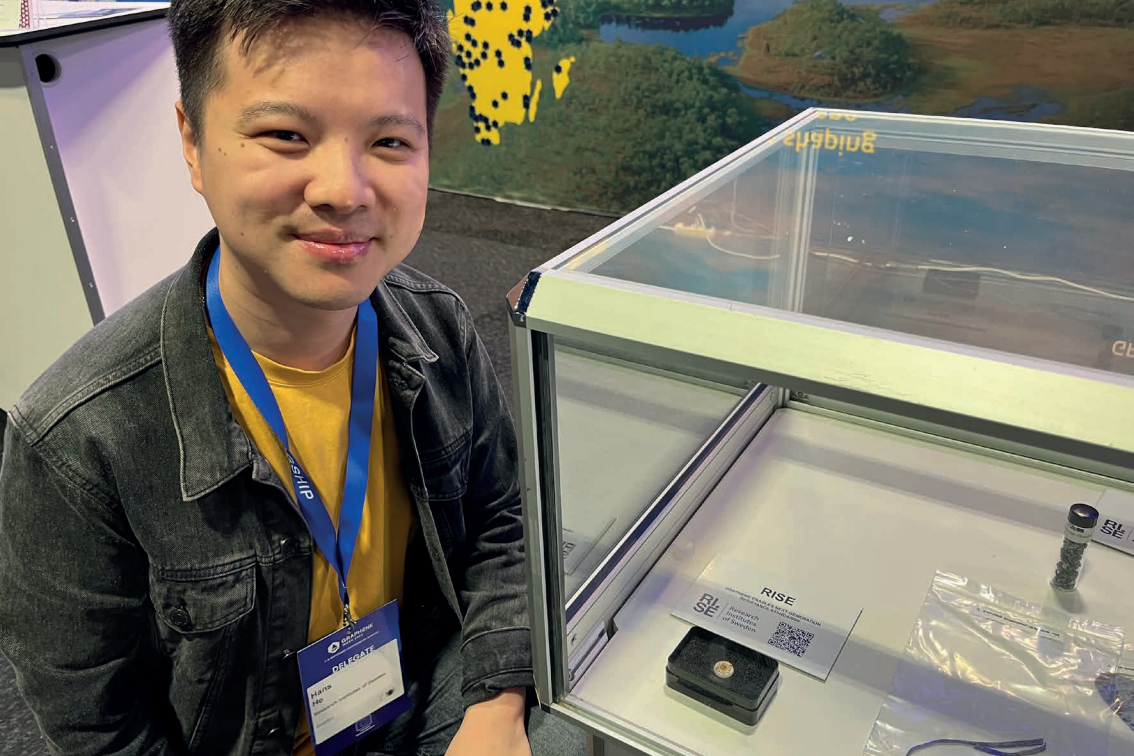
1 The graphene-based composite used in the car's ... was not burn or

2 Graphene in the lateral and rear panels facilitates dissipation of vibrations and oscillations.

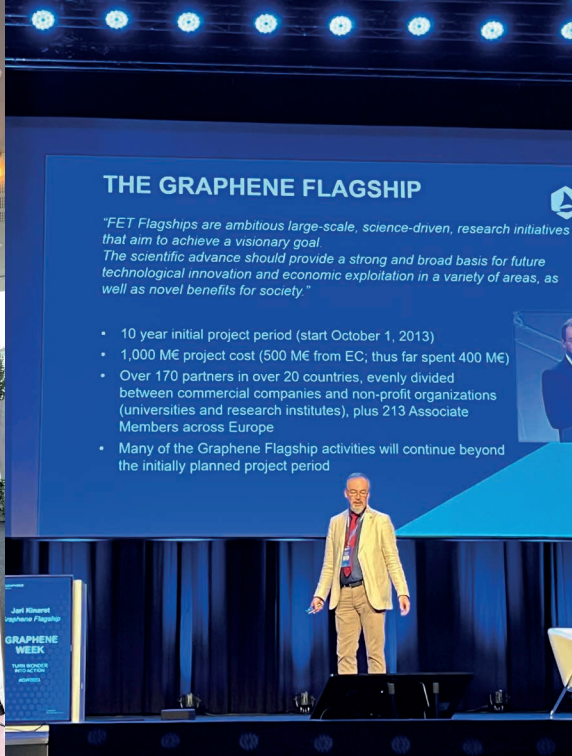
3 Graphene-enhanced composites in the front structural panel improve the car's ability to resist deformation under load.


weden loves
Graphene
SPEAKER
Arne
Quellmalz
LANARK
Sweden loves Graphene
Swedish Graphene Forum


HAMNKROGEN
FISK &
SKALDJUR


RISE
DELEGATE


Graphene Disruptive
Technologies


THE GRAPHENE FLAGSHIP
"FET Flagships are ambitious large-scale, science-driven, research initiatives that aim to achieve a visionary goal.
The scientific advance should provide a strong and broad basis for future technological innovation and economic exploitation in a variety of areas, as well as novel benefits for society."
• 10 year initial project period (start October 1, 2013)
• 1,000 M€ project cost (500 M€ from EC; thus far spent 400 M€)
• Over 170 partners in over 20 countries, evenly divided between commercial companies and non-profit organizations (universities and research institutes), plus 213 Associate Members across Europe
• Many of the Graphene Flagship activities will continue beyond the initially planned project period
Jari Kinaret
GRAPHENE
WEEK


GRAPHENE
FLAGSHIP
STANDARDISATION
GRAPHENE
WEEK


GRAPHEN
Electrical conductivity
Thermal conductivity
Fire resistance
Chemical resistance
Moisture barrier
Multifunctionality for weight & cost reduction
5 gr/sqm
GRAPHENE WEEK
Erik Khranovskyy
Grafren
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TURN WONDER INTO ACTION
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Funded by the European Union
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TURN WONDER INTO ACTION


Together we are shaping
the future of Graphene
and 2D materials


A material that is part of the natural carbon cycle does not have to be recycled to leave zero waste or deplete the finite natural resources
GRAPHENE WEEK
Anna Carlsson
Bright Day
GRAPHENE WEEK
TURN WONDER INTO ACTION
#GW2023


GRAPHENE WEEK
EUROPE'S LEADING GRAPHENE AND 2DM CON
GRAPHENE
Christian Werdinius
Provexa
GRAPHENE WEEK
TURN WONDER INTO ACTION
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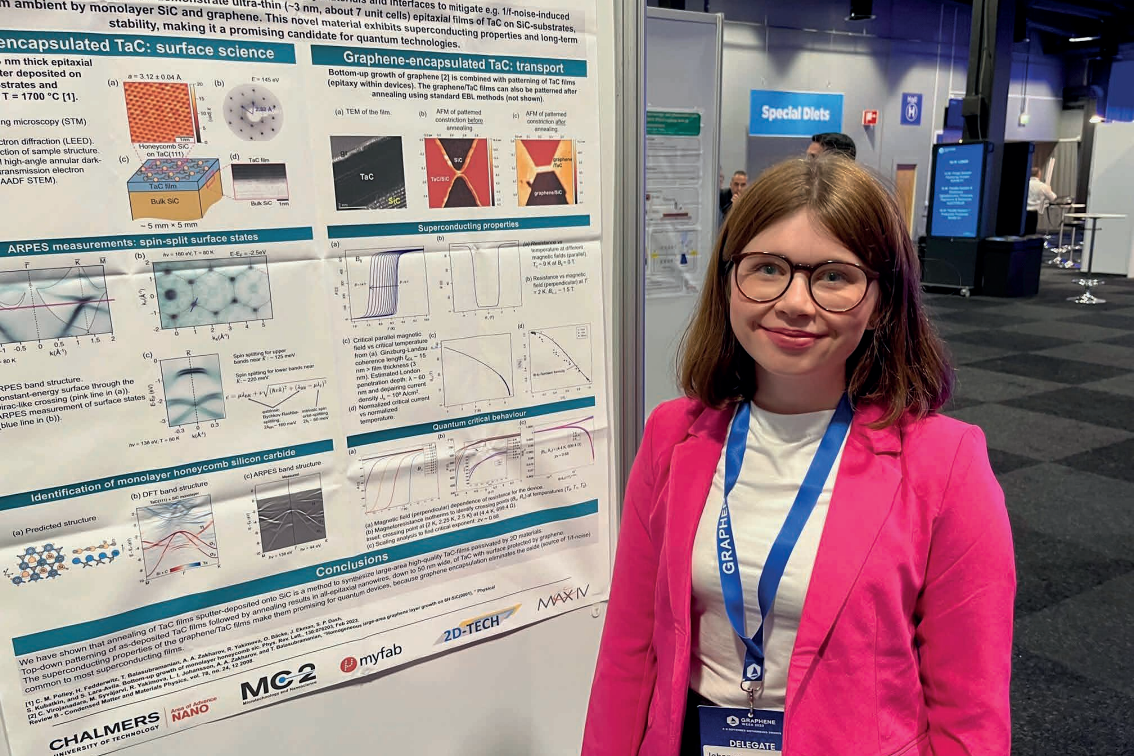
Comb 22 in scale up and new Product launches
Additional challenges


GRAPHENE FLAGSHIP



stability, making it a promising candidate for quantum technologies.
encapsulated TaC: surface science
Graphene-encapsulated TaC: transport
Bottom-up growth of graphene [2] is combined with patterning of TaC films (epitaxy within devices). The graphene/TaC films can also be patterned after annealing using standard EBL methods (not shown).
(a) TEM of the film.
(b) AFM of patterned constriction before annealing
(c) AFM of patterned constriction after annealing
Honeycomb SiC on TaC(111)
TaC film
Bulk SiC
~ 5 mm × 5 mm
ARPES measurements: spin-split surface states
Superconducting properties
Quantum critical behaviour
Identification of monolayer honeycomb silicon carbide
(a) Predicted structure
(b) DFT band structure
(c) ARPES band structure
Conclusions
Special Diets
CHALMERS
UNIVERSITY OF TECHNOLOGY
Area of Advance NANO
MC2
myfab
2D-TECH
MAX IV
GRAPHENE
DELEGATE


Hall
H1
GRAPHENE
FLAGSHIP
Collaborate
with us!
Standardisation -
Enabling 2D materials
in indu
WHAT STANDA
Vocabulary
Sweden
Graphene

REGION VÄSTRA GÖTALAND
SAHLGRENSKA UNIVERSITY HOSPITAL

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UNIVERSITY OF GOTHENBURG

Poster nr. 91

Development of a method for exposure- and risk assessment of graphene.

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Background

Graphene has many useful properties. The toxicity, however, has yet to be determine.

Today there are no standardized tools to measure graphene in workplace air. Thermal optical analysis (TOA) is a standardized tool that is used to measure diesel exhaust exposure by measuring elemental carbon (EC).

Purpose

Investigate the possibility to use thermal optical analysis as a standardized tool for air exposure measurements of graphene and its derivatives, to use it as a tool for exposure and risk assessment of graphene.

Figure 1. Graphite nano platelet diluted in water.

Method

TOA is a method were the samples collected on quartz fibre filters are heated according to a pre-determined protocol. The filter is first heated in a He atmosphere and then in a $He-O_2$ atmosphere. The EC will leave the filter in the $He-O_2$ phase and be detected with a flame ionisation detector (FID).

Results

In figure. 2 the analysis of different graphite and graphene derivatives be observed. Clear differences in emission temperatures can be seen between the different materials.

In figure. 3 the results from an air measurement at a graphene producer can be observed. Similarities in emission temperature can be seen between air samples and graphene material.

Take home message

Thermal optical analysis is a possible method for studying graphene exposure.

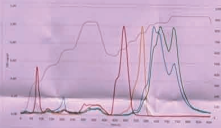

Figure 2. (—) GO, (···) rGO2, (—) GNP 2 and (—) GNP 1 and (—) is the temperature . Results from the analysis of two graphite nanoplatelets materials (GNP), one graphene oxide (GO) and one reduced graph oxide (rGO). All signals received from the FID has been n a 0 to 1 scale to easier be able to compare the differen

Figure 3. (—) Person 1, (···) Person 2. Background and (—) is the te measurements from graphene pr personal measurements and one ba

Conclusion

Thermal optical analysis appe quantify and analyse graph determine the air concentratio There also some indication differentiate between differe more research is needed.


SIO GRAFEN
What is SIO Grafen?
Sweden loves Graph

High mobility graphene field effect transistors on EVA/PET

Munis Khan and August Yurgens

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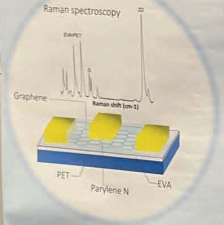
Introduction

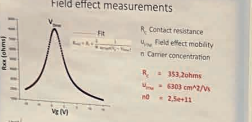
Scalable, and cost-efficient technology to fabricate high mobility graphene field-effect transistors (GFETs) remains challenging even to this day. Here, we report a highly scalable sacrificial-layer free fabrication method of flexible graphene field-effect transistors. We use Parylene N as a dielectric. At room temperature, we measure charge carrier mobility in the range of 5600-8000cm^2/Vs. We demonstrate the long-term stability with minimum hysteresis of such GFETs. The resulting insensitivity towards additional lithography steps enable vertical device integration of graphene for multi-stacked electronics fabrication.

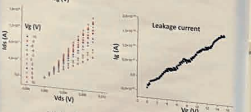
Experimental

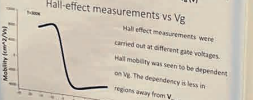
1. Graphene synthesis was carried out by low-pressure CVD.
2. Source drain pads were fabricated on EVA/PET by standard photolithography.
3. CVD graphene on copper was laminated to EVA/PET with source drain pads.
4. Parylene N was deposited using CVD method.
5. Gate electrode was patterned using standard photolithography and metal evaporation.

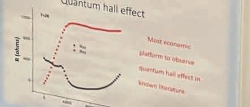
Results











Conclusion

1. Fabricated GFETs show excellent transport properties.
2. Field-effect mobility was extracted using the fitting method proposed by kim et al. APL 94, 06217, 2009.
3. High hall and field effect mobility is reported for an extremely scalable and economic method.
4. Minimum hysteresis and very low leakage current is reported in fabricated GFETs.
5. Quantum hall effect observed in prepared devices validates the excellent transport properties.

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