UD
CORPO
RATION

Make & Connect the new wave

UDerive

STORY

UD (UDerive) Co., Ltd. has a UDNANO brand related to graphene material production and has a UDCORE brand of production of graphene parts and casting materials.

UDNANO

UDNANO is a hybrid graphene-related brand of UD Co., Ltd. built with our technology. The UDNANO story began with the production of Hybrid graphene. We design and produce graphene products that are substantially effective and highly applicable to the industry. We pursue a diversity of products and have the technology to produce customized products that designed to fit clients' use.

Graphene manufacturing begins

New method/Hybrid graphene production
Hybrid graphene Hi-puri and Hydra production with high dispersion and excellent conductivity through hydrogen treatment.

Excellent Graphene Composite Production

Our graphene composites are producing in a variety of types, including metals and ceramics; Graphene coated composites, Graphene functionalized composites, Graphene riched composites.

Graphene Aluminum Composite Production

Hybrid graphene-aluminum composite
for achieving the necessary functions as an aluminum alloy.

Conductive Graphene Ink, Paste and Functional Paint Production

Suitable product production for a wide range of viscosity, excellent conductivity, high-temperature usability, and excellent diffusion(spreadability) and the moderate drying conditions fitting for various business filed.

UDCORE

UDCORE is a UD's brand that has been written the company's story with our technology from the beginning. We produce key materials and components with great applicability and efficiency and have the relevant technology. UDCORE can help the industry with graphene technology.
Producing a variety of customized products can be designed and produced depending on use.

Materials for Electric

Graphene and SnO_2 Composite production for gas sensors that reduce electrical barriers to operate at room temperature for reducing electrical signal noise/loss.

Graphene Heater Unit

Flexible heaters, Aluminum plate heaters, Stainless steel plate heaters production.
Flexible heater components with stable thermal efficiency and graphene plate heaters that have good maintaining efficiency and high-temperature uniformity produced by a wide heating area.

Graphene Block Heater Module

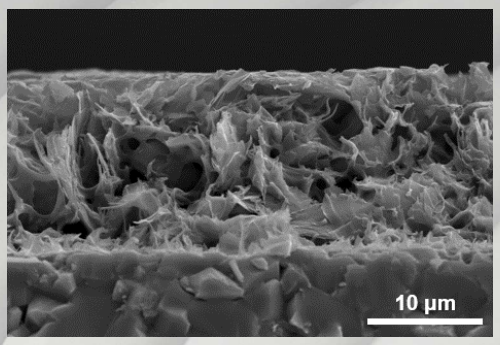
Producing block-structure heater modules with excellent thermal energy efficiency:
Higher energy efficiency than conventional electric heaters.

Graphene Metal Alloy Castings

Mass-productionable Graphene metal alloy materials.

Technology

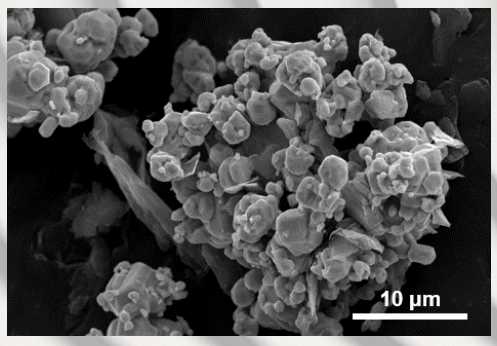
UDNANO is a brand of UD corporation, consists of UD's unique technology-based products. From hybrid graphene to graphene-based composites, conductive inks, pastes, functional paints, and graphene metal alloy materials, we have achieved a wide range of technological growth with our technology.
UD (UDerive) Co., Ltd. always focuses on making energy efficiency, core composite with excellent properties and applications of them to be meaningful energy materials for nature and people.



Nano Materials/Hybrid Graphene

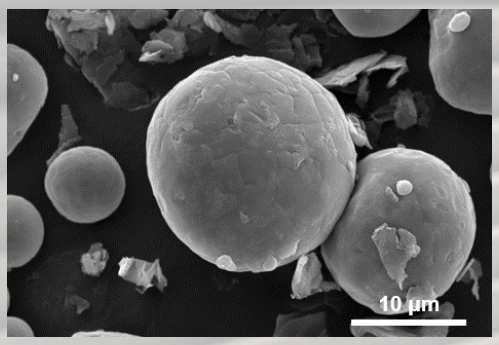
UD (UDerive) Co., Ltd. has the technology to produce hybrid graphene.
Hybrid graphene is distinguished by Hi-puri with excellent dispersion, conductivity, and excellent thermal conductivity and Hydra with 3% hydrogen content for special reactivity produced through the hydrogen treatment process. They are designed to address the commercialization of graphene materials and the difficulties of mass use.

Hi-puri and Hydra can be mass-produced in a safe environment and are supplied in the form of graphite for good workability and applicability.
It is also intentionally designed to achieve excellent dispersion in solvents when applied, delivering superior performance as graphene.
Graphene from UD (UDerive) Co., Ltd. will help reduce the consumption of indiscriminate resources that heat our planet, as well as the energy sources needed to achieve higher energy efficiency. Our graphene applications and their TDS prove this.
We hope to receive a lot of industry attention and love with the new type of graphene, Hi-puri and Hydra.



Graphene Composite

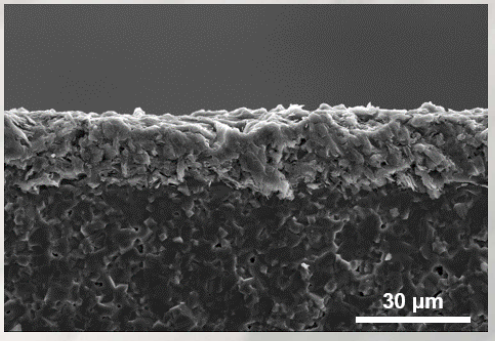
UD (UD (UDerive) Co., Ltd. has the technology to produce composites in a variety of ways based on hybrid graphene. We have the technology to produce graphene-coated composites, graphene functionalized composites, and graphene riched composites.
To meet a variety of objectives, by producing graphene composites, Solving the difficulties of purchasing and applying graphene composites, and trying to have a positive impact on the industry.
Among the graphene composites, composite for gas sensor devices detected at room temperature and graphene metal castings materials are important topics. We are pleased to introduce the composites designed and produced by us. If you are interested in developing composites, please feel free to contact us.



Graphene Coated Composite

Hi-puri & Hydra is hybrid graphene synthesized in UD's hybrid method, they show excellent dispersion, excellent electrical properties, and thermal conductivity.
This synthesis became the foundation of our Hi-puri & Hydra Al mixture/composite making.
Hi-puri & Hydra Coated Al composite enable to control the properties of the alloy when casting the alloy through hydrogen content control and they are excellent in mechanical, thermal, and electrical properties.
As a material that suppresses the separation between graphene and metal, they are excellent casting material capable of mass-producing graphene-metal alloys.

Aluminum alloys made from UD's Hi-puri & Hydra Coated Al composite have excellent results in elasticity, yield, tensile strength, and elongation.
Our technology will change the circumstance of the metal industry by the development of major industrial materials.



Graphene Conductive Paste, Ink and Functional Paint for Heat Control

Starting with the production and manufacture of graphene in our hybrid way, the excellent characteristics of our graphene have been done in the lineup of conductive inks, pastes, spray solvents, and functional paint products.
We've launched a series of HICON with 3 kinds of conductive graphene paste and 2 kinds of ink by the volatile/non-volatile lines, various viscosity, and temperatures for a wide range of applications.

The HICON series enables to be used of various application methods (inkjet, silkscreen, roll-to-roll, spray, etc.) and to be used in a variety of temperature ranges (room temperature ~ 900 °C). And they are designed to be applied quickly to a wide range of industries based on excellent diffusion.
The HIST series are functional paints and spray materials that protect the target from high temperatures with the function of the non-flammable, flame retardant and insulated, Hist-C type is designed in terms of protection and maintenance, and Hist-P type is designed in terms of safety and protection.

Materials for Electric

UD's graphene metal oxide composite is developed for applying to electronic devices.
Among them, the graphene-SnO_2 composite has an excellent performance in sensors for detecting atmospheric NO_2.
In general, SnO_2 is all thing of the sensor material for NO_2 gas sensor, but our products have graphene functionalized structure on the SnO_2-Sn:core-shell structure that has changed the work function and the bandgap of SnO_2. This structural design allows the sensor to operate at room temperature, although the existing sensor operating temperature was over 200 °C.
At the same time, electrical barriers between grain boundaries are reduced to reduce electrical signal noise or loss.

Energy Tech (Unit)

Our hybrid graphene heater is based on UD's graphene heating element manufacturing technology.
Our parts have high electrical energy efficiency (over 300%).
Flexible graphene heating unit: Hience-F series that show stable heating efficiency even in a bent state, and Graphene thin-film heating unit, Al/Stainless covered: Hience-U/SU series, which have good temperature uniformity and have a large heating area, which is advantageous for maintaining efficiency.
We offer a wide range of using temperatures from 150 °C to 600 °C.

It can be applied to various places such as electric vehicles, fuel cells, electronic products, curved devices, electronic housing equipment, and industrial equipment. This technology focuses on energy efficiency to reduce the burden of energy depletion and use thermal and electrical energy.

Graphene Block Heater Module

Our module has high thermal energy efficiency and reduced electric energy consumption by over 70% compared to conventional electric heaters. A block structure makes it easy to expand.

Graphene Metal Casting Materials

Graphene-metal alloy has been proved through numerous studies that it has superior mechanical, thermal, and electrical properties compared to conventional metal or metal alloys.
However, the density difference between graphene and metal caused separation and agglomeration between two materials during the casting process, so no casting material could overcome this.

In response, we introduce Hi-puri & Hydra Al mixture/composite cast material developed based on UD's technology to suppress graphene-metal separation and form the graphene-metal alloy.
Hi-puri & Hydra Al mixture/composite castings are castings capable of mass-producing graphene-aluminum alloys and are designed to control properties by regulating the hydrogen content of aluminum alloy castings.
The alloy cast through UD's Hi-puri & Hydra Al mixture/composite cast material showed interesting results of a 130% increase in elastic modulus, a 20% increase in yield strength, and 9% elongation.
This means that alloys cast from Hi-puri & Hydra Al mixture/composite tech can be expected to change a variety of industries.
In addition to being used in automotive and aviation, Hi-puri & Hydra Al mixture/composite tech are expected to be apply to a wide range of aluminum products used in construction and everyday life.
UD's graphene metal casting technology will bring a new trend in the hybrid aluminum industry.

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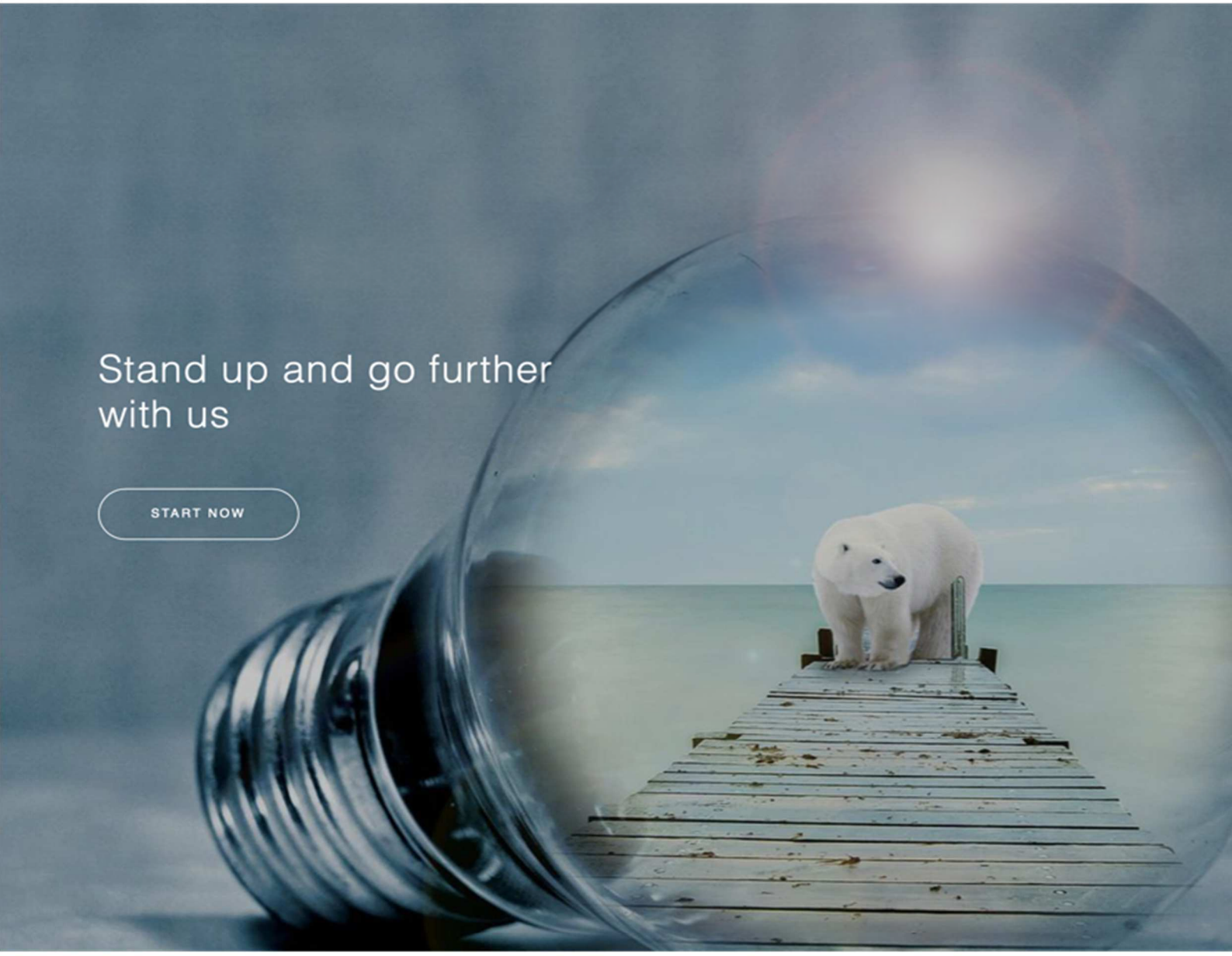


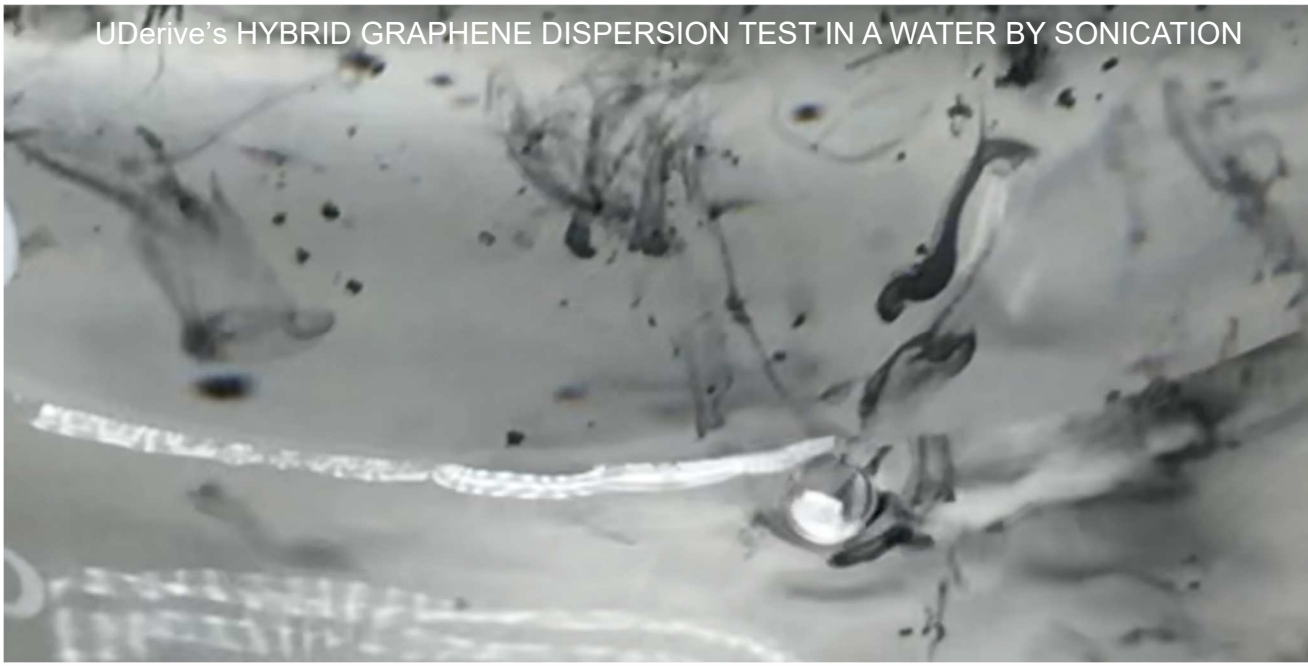
Hybrid Graphene

UDNANO, through our hybrid manufacturing method, offers a wide range of graphene products, from powders to composites.
Furthermore, our inks and paints are highly efficient and effective in a variety of industries.
Our superior hybrid graphene is in line with the new energy era.
UDNANO's products are for nature and people,
We hope to be loved by the next generation of energy materials.

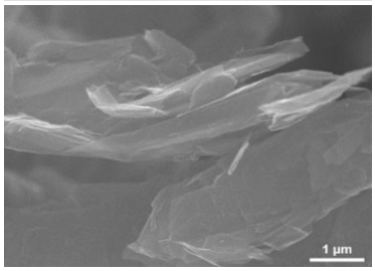
Hybrid Method

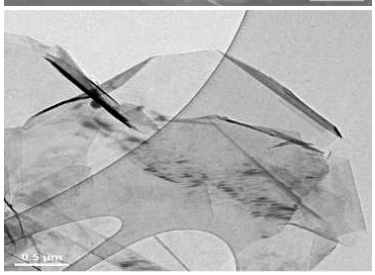
(Chemical peeling + Physical peeling)

Using chemical and physical methods
Our graphene form is intentionally designed to have easy workability, such as normal graphite.
But when used in process, unlike normal graphite. it has been developed to show the characteristics of graphene through strong dispersion even applied in water without additives.
The excellent dispersibility can be found in our products.



Hi-puri





A new type of graphene with excellent dispersion, electrical and thermal conductivity, manufactured in a hybrid method. Hi-puri is designed to be highly dispersive and makes it easy to adapt to a wide range of applications through our technology.
Besides, Hi-puri with little impurities can be expected to be highly reliable when applied.

Properties

Form: Powder
Synthesis method: Hybrid
Average flake thickness: ≤5 ㎚
Average X & Y Dimensions (㎛, D_{50}): ≤5
True Density(g/㎤): ≤2.20
Color: Black
Odor: Odorless

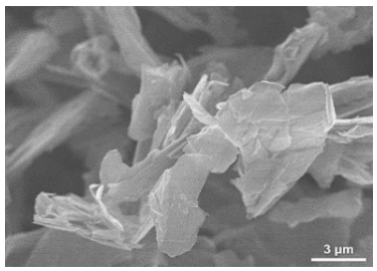
Recommended for use

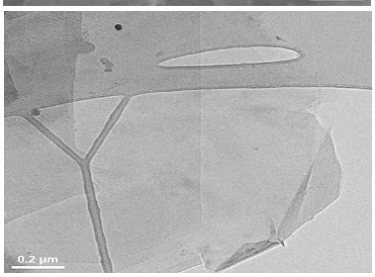
Biomedical for use
Battery(Cathode)
Supercapacitors
Graphene research
Heat-sink and resistance materials
Electric contact materials
Printable & Wearable graphene electronics

(unit: at%)

	C	O	N	S	H
Content	≥99	≤0.95		≤0.05	

Hydra





Functional graphene with excellent dispersibility, electrical properties, and thermal conductivity characteristics produced by our hybrid method.
Hydra was developed to be easily applied to the required groups of graphene and activated carbon by holding a layer of carbon with hydrogen interposed between edges or layers with a difference in hydrogen content.
Hydra is constantly researching and developing and has more performance expectations.

Properties

Form: Powder
Synthesis method: Hybrid
Average flake thickness: ≤5 ㎚
Average X & Y Dimensions (㎛, D_{50}): ≤6
True Density(g/㎤): ≤2.20
Color: Black
Odor: Odorless

Recommended for use

Biomedical for use
Battery(Cathode)
Supercapacitors
Graphene research
Heat-sink and resistance materials
Electric contact materials
Printable & Wearable graphene electronics

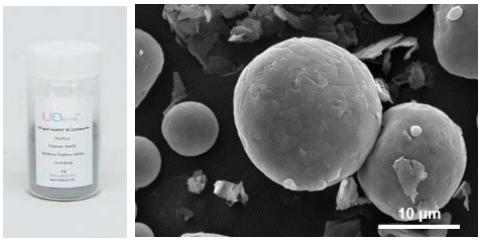
(unit: at%)

	C	O	N	S	H
Content	≥92	≤5			≤3

Graphene Coated Composite

Recommended for use
Al casting material and additive, SOFC cover, Aircraft wing and body, Car body and interior, Vehicle pistons, Frame bar, Industrial air conditioning system, Outdoor unit heat exchanger, Car air conditioner material, Train body and interior, Wall of building, Ceiling, Roofing, Furniture cabinet, Lighting/ship/solar/machinery plate and cover, Insulation material, Shell and cover, Medical products, PS/CTP bottom plate, Aluminum frozen container and Special container

Hi-puri Coated Al Composite
Hydra Coated Al Composite



Particle size: 21 ㎛ (D_{50})

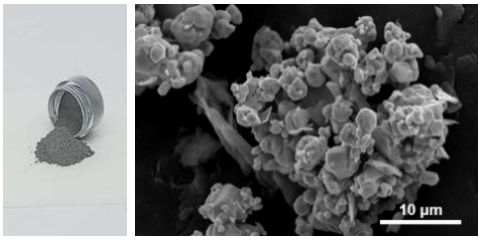
The composites are excellent in mechanical, thermal, and electrical properties, and are materials that suppress the separation between graphene and metal. They are excellent casting materials that can mass-produce graphene-metal alloys.
When casting was applied, it showed a tendency to improve various properties.

* From the UDCORE page, you can see that it has been applied to '**Graphene Metal Casting Materials**'.

Hi-puri Functionalized Composite

Recommended for use
Contact materials, Ink and paste, Aircraft/medical semiconductor element, Electrode for lithium-ion batteries, Protection primer, Anti-abrasion materials, High refractive materials, Anti-reflection materials, Hard coating, Anti-static material

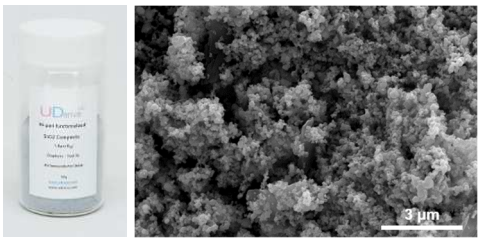
Hi-puri Functionalized Ag



Graphene(wt%) : 3
Particle size: 10 ㎛ (D_{50})

Recommend
Available for contact materials
Available for semiconductor devices

Hi-puri Functionalized SnO_2



Graphene(wt%) : 3
Particle size: 1.8 ㎛ (D_{50})
Detection is possible even at room temperature.
Reduce electrical signal noise/loss.

Recommend
Available for semiconductor devices (Via customizing)
Air detection sensor (NO_2 gas), Biomedical, Light-emitting device (Green),
Photo lumine/Electro lumine sensor element,
Soldering material(Via customizing)

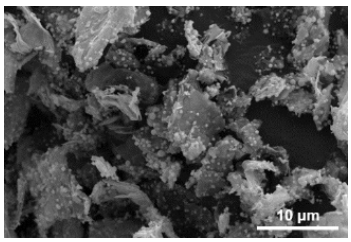
* From the UDCORE page, you can see that it has been applied to **'Material for Electric'**.

Hi-puri Riched Composite

Recommended for use
Contact materials, Ink and paste, Aircraft/medical semiconductor element, Electrode for lithium-ion batteries, Protection primer, Anti-abrasion materials, High refractive materials, Anti-reflection materials, Hard coating, Anti-static material

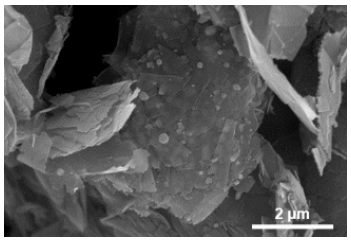
Hi-puri Riched SnO_2

SnO_2(wt%): 30
Particle size: 11.8 ㎛ (D_{50})
SnO_2 nanoparticles are functionalized on graphene.

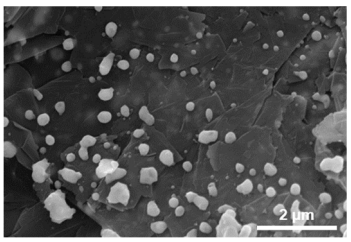
Hi-puri Riched ZnO

ZnO(wt%): 30
Particle size: 11 ㎛ (D_{50})
ZnO nanoparticles are functionalized on graphene.

Hi-puri Riched Ag

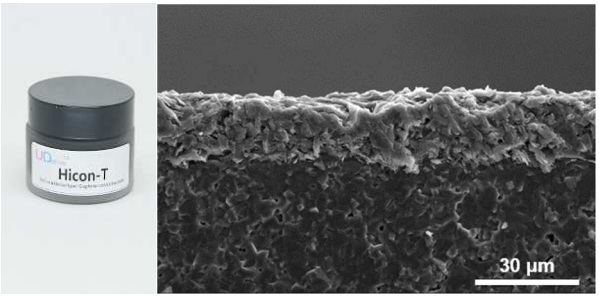
Ag(wt%): 30
Particle size: 11 ㎛ (D_{50})
Ag nanoparticles are functionalized on graphene.

Our graphene pastes and inks with excellent conductivity have been released in HICON series with volatile/non-volatile lines and various viscosities to meet various uses.
HIST series protects the object from high-temperature heat and has non-flammable, flame-retardant, and insulating functions. The HIST C-type is designed from the viewpoint of protection and maintenance, and the HIST P-type is designed from the viewpoint of safety. It is applicable for flexible printed circuit boards(FPCB)/flexible electrodes, parts, medical sensors, functional fabrics, solar cells, displays, quick-drying spray solvents, functional exterior/interior coatings, etc.

Paste

HICON-T



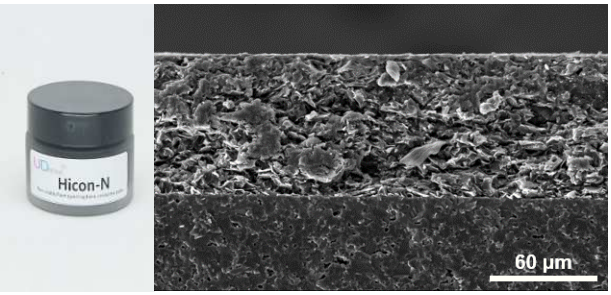
Non-volatile/High-viscosity/Conductive Paste

Main characteristics
Type: Gel
Life waterproofing
Silkscreen available
High-temperature available
(max 900 °C/ recommend 700 °C)

Recommended for use
Electrode material:
Medical/SOFC for/Capacitor
Electric car battery materials
Challenge reinforcement
Circuit repair
High-frequency shield
Graphene hybrid energy
High-temperature conductive adhesive

Characteristics and functions
- Graphene: 15 wt%
- Sheet resistance: 10 Ω/sq
at 25 ㎛ thickness
- Conductivity: 2.5×10^{-2} Ω·㎝
- Viscosity: 350 cP (±50 cP,
measuring temperature: 25 °C)
- Curing conditions: 120 °C/1hour
- Curing conditions
for high temperature use (over 400°C):
First step: 120 °C, 1hour
Second step: 450 °C, 1hour
- Hardness: 3 H
- Maximum available temperature: 900 °C
- Recommend temperature: 700 °C
- As conductive adhesives for high
temperatures: 450 °C
- Applied materials: Metals,
semiconductors, wood, glass, etc.
- Life waterproof/silkscreen available

HICON-N



Non-volatile/Mid-viscosity/Conductive Graphene Paste

Main characteristics and functions

Type: Paint
Life waterproof
Silkscreen available

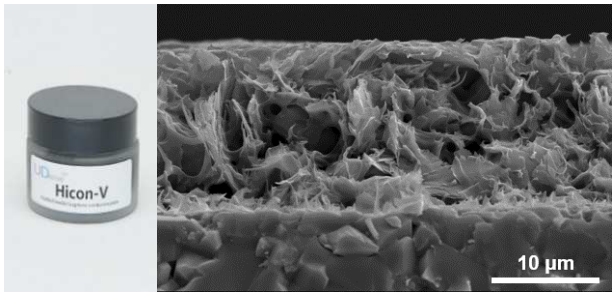
Characteristics and functions

- Graphene: 16 wt%
- Sheet resistance: 29.6 Ω/sq
  at 25 ㎛ thickness
- Conductivity: 7.40×10^{-2} Ω·㎝
- Viscosity: 550 cP (±50 cP,
  measuring temperature: 25 °C)
- Curing conditions: 120 °C, 1 hour
- Hardness: 3 H
- Maximum available temperature: 350 °C
- Applied materials: Metals,
  semiconductors, wood, glass, etc.
- Very good diffusion/
  Moderate waterproofing.
- when silk screening –
  Enough applying time & workability

Recommended for use

Electrode material: Medical/SOFC/Capacitor, Electric vehicle battery material, Challenge reinforcement, Circuit repair, High frequency shield, Graphene hybrid energy

HICON-V



Volatile/Flexible/Conductive Graphene Paste

Main characteristics and functions

Type: Paste
Excellent adhesion
Quick-drying point: 5 secs
Strong in water condition
Limited silkscreen available
Limited 3D printing available
FPCB(Flexible Printed Circuit Board) available

Characteristics and functions

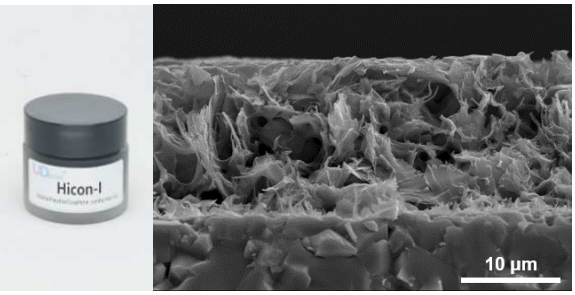
- Graphene: 16 wt%
- Sheet resistance: 99.6 Ω/sq
  at 25 ㎛ thickness
- Conductivity: 2.49×10^{-1} Ω·㎝
- Viscosity: 550 cP (±50 cP,
  measuring temperature: 25 °C)
- Curing conditions:
  Surface: 5 secs
  Fully dry: 25 °C, 30 mins or
  60~80 °C, 10 mins
- Hardness: 6 B
- Maximum available temperature: 200 °C
- Applied materials: Metals,
  semiconductors, wood, glass, etc.
  (*Limited plastic and foam substrates)
- Very good diffusion/Strong waterproofing

Recommended for use

Conductive adhesive, Conductive ink, FPCB, Medical sensor, Functional fabric, Solar cell, 3D printer solvent

Ink

HICON-I



Volatile/Flexible/Conductive Graphene Ink

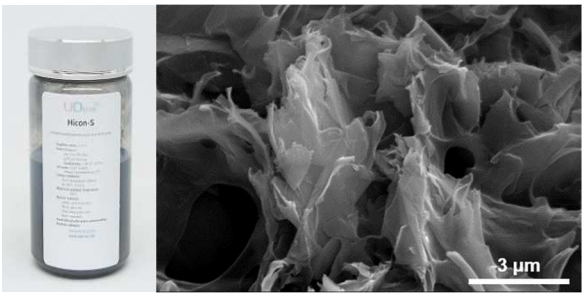
Main characteristics and functions

Type: Ink
Excellent adhesion
Quick-drying point: 20 secs
Strong in water condition
Limited silkscreen available
Limited 3D printing available
FPCB(Flexible Printed Circuit Board) available

Characteristics and functions

- Graphene: 12 wt%
- Sheet resistance: 99.6 Ω/sq at 25 ㎛ thickness
- Conductivity: 2.49×10^{-1} Ω·㎝
- Viscosity: 200 cP (±30 cP, measuring temperature: 25 °C)
- Curing conditions:
  Surface: 20 secs
  Fully dry: 25 °C, 30 mins or 60~80 °C, 10 mins
- Hardness: 6 B
- Maximum available temperature: 200 °C
- Applied materials: Metals, semiconductors, wood, glass, etc. (*Limited plastic and foam substrates)
- Good diffusion/ Strong waterproofing/Excellent adhesion

HICON-S



Volatile/Flexible/Conductive Graphene Liquid for Spray

Main characteristics and functions

Type: Ink for Spray
Excellent adhesion
Quick-drying point: 60 secs
Strong in water condition
Limited silkscreen available
Limited 3D printing available
FPCB(Flexible Printed Circuit Board) available

Characteristics and functions

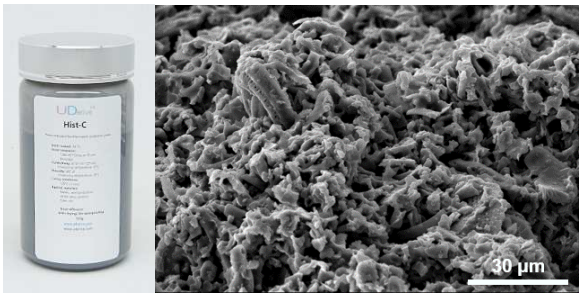
- Graphene: 4 wt%
- Sheet resistance: 99.6 Ω/sq at 25 ㎛ thickness
- Conductivity: 2.49×10^{-1} Ω·㎝
- Viscosity: 150 cP (±30 cP, measuring temperature: 25 °C)
- Curing conditions:
  Surface: 50 secs
  Fully dry: 25 °C, 30mins or 60~80 °C, 10mins
- Hardness: 6 B
- Maximum available temperature: 200 °C
- Applied materials: Metals, semiconductors, wood, glass, etc. (*Limited plastic and foam substrates)
- Good diffusion/ Strong waterproofing/Excellent adhesion

Recommended for use

Conductive adhesive, Conductive ink, FPCB, Medical sensor, Functional fabric, Solar cell, 3D printer solvent

Functional Paint/Spray

HIST-C



Heat control master

Protects against heat through phase transformation of the paint and air bubbles when used at high temperatures.

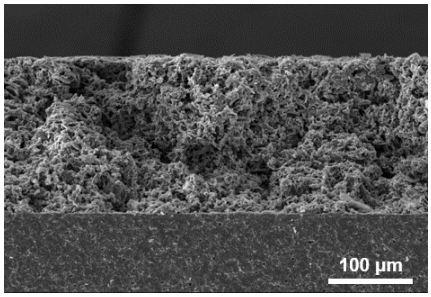
Main characteristics and functions

Type: Paint
Flame retardant, Non-flammable
High-temperature heat emission/reflecting
Excellent adhesion
Electrical insulation
*Applicable by the thickness
*Protection against outside heat
*By thickness, the ability to dissipate heat and bounce the heat change when high temperatures are applied

Characteristics and functions

- Solid content: 34 wt%
- Conductivity: 4.70×10^{12} Ω·㎝
- Viscosity: 700 cP (±50 cP, measuring temperature: 25 °C)
- Curing conditions: 120 °C, 1 hour
- Hardness: 6 H or more
- Applied materials: Metals, semiconductors, wood, glass, plastic, foam, etc.
- Good diffusion/ (After drying) Life waterproofing

HIST-CS



Heat control master

Possible to apply thinly spraying. The level of protection against heat can be adjusted by the coating thickness.

Main characteristics and functions

Type: Spray level, Sprayable
Flame retardant, Non-flammable
High-temperature heat emission/reflecting
Excellent adhesion
Electrical insulation
*Applicable by the thickness
*Protection against outside heat

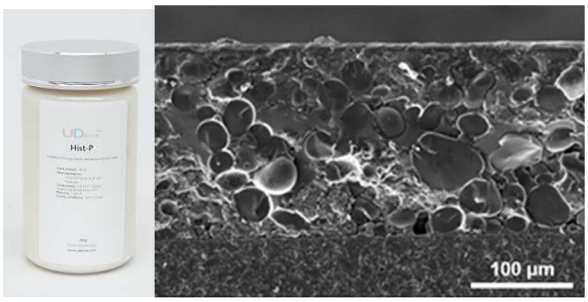
Characteristics and functions

- Solid content: 13 wt%
- Conductivity: 4.70×10^{12} Ω·㎝
- Viscosity: 50 cP (±20 cP, measuring temperature: 25 °C)
- Curing conditions: 120 °C, 1 hour
- Hardness: 6 H or more
- Applied materials: Metals, semiconductors, wood, glass, plastic, foam, etc.
- Good diffusion/ (After drying) Life waterproofing

Recommended for use

Construction, Vehicle, Device, Flame retardant, Nonflammable, External heat absorber/Release agent, Heat reflector

HICON-P



High protection from heat

Protects against heat through phase transformation of the paint and air bubbles when used at high temperatures. The level of protection against heat can be adjusted by the coating thickness.

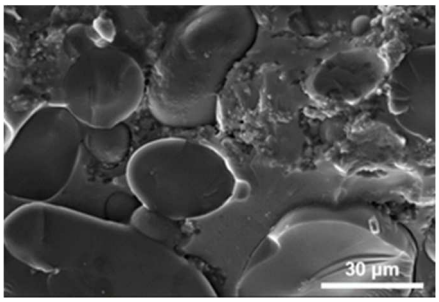
Main characteristics and functions

Type: Paint
Excellent adhesion
Heatshield
Strongly flame retardant
Insulation
Electrical insulation
Non-flammable
Life waterproof
*Even applied thin thickness, Maintain excellent performance

Characteristics and functions

- Solid content: 45 wt%
- Conductivity: 2.83×10^{12} Ω·㎝
- Viscosity: 1148 cP (±50 cP, measuring temperature: 25 °C)
- Curing conditions: 120 °C, 1 hour
- Hardness: 6 H or more
- Applied materials: Metals, semiconductors, wood, glass, plastic, foam, etc.
- Good diffusion/ (After drying) Life waterproofing

HICON-PS



High protection from heat

Possible to apply thinly spraying. The level of protection against heat can be adjusted by the coating thickness.

Main characteristics and functions

Type: Spray level, Sprayable
Excellent adhesion
Heatshield
Strongly flame retardant
Insulation
Electrical insulation
Non-flammable
Life waterproof
*Even applied thin thickness, Maintain excellent performance

Characteristics and functions

- Solid content: 23 wt%
- Conductivity: 2.83×10^{12} Ω·㎝
- Viscosity: 80 cP (±30 cP, measuring temperature: 25 °C)
- Curing conditions: 120 °C, 1 hour
- Hardness: 6 H or more
- Applied materials: Metals, semiconductors, wood, glass, plastic, foam, etc.
- Good diffusion/ (After drying) Life waterproofing

Recommended for use

Aviation/Ship, Electrical device, Construction, Vehicle, Device, Flame retardant, Nonflammable, External heat absorber/Release agent, Heat reflector

UD
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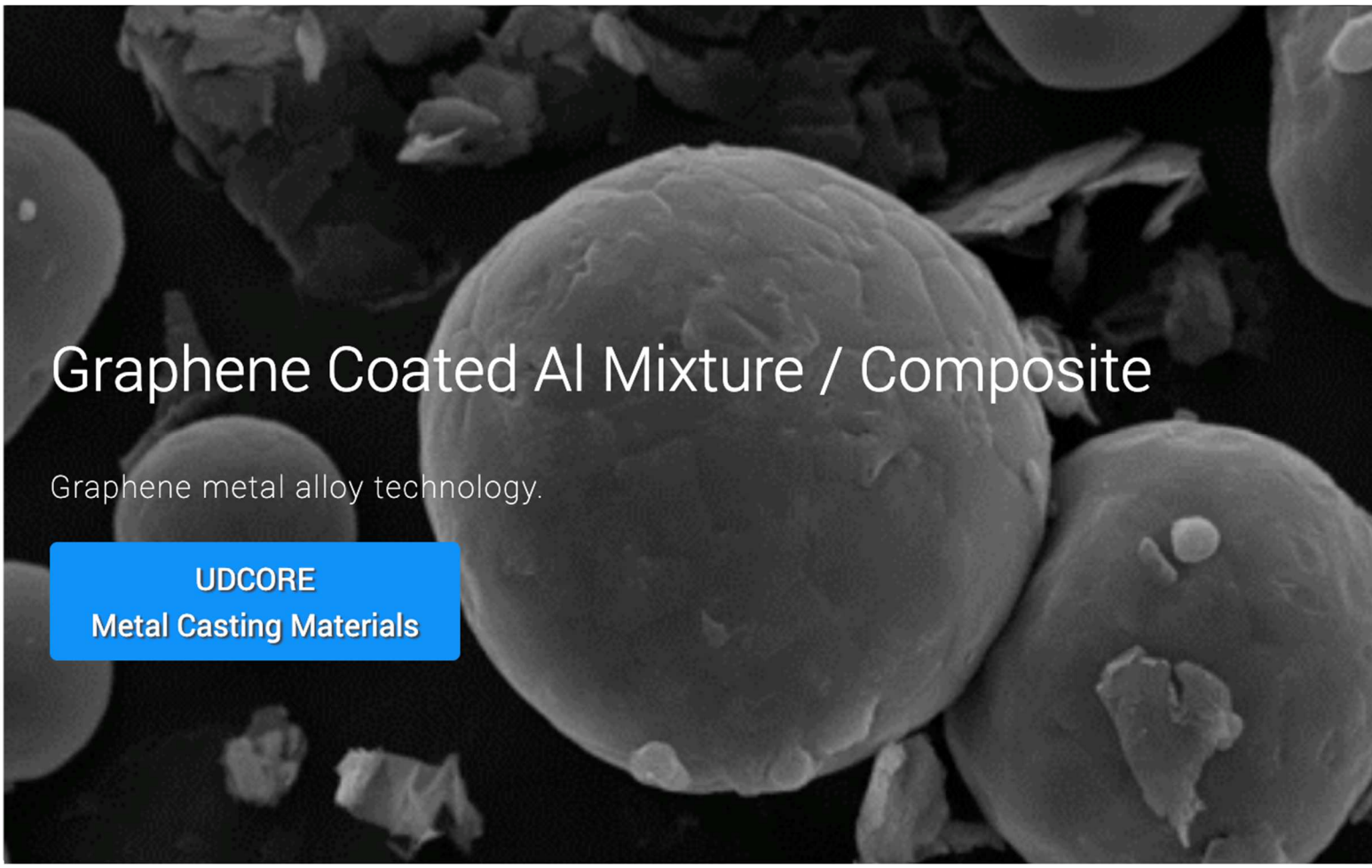


Graphene Coated Al Mixture / Composite

Graphene metal alloy technology.

UDCORE
Metal Casting Materials

Unit

UDerive has unique technologies and offers a wide range of graphene products from hybrid graphene to application parts. Based on its excellent efficiency, we produce the Hience-F series, a thin and light flexible graphene heater unit, and Hience-U/SU series with excellent heat efficiency with a stable heating area covering (aluminum/stainless) suitable for the application. UD offers heating elements in various sizes and types. Compared to conventional ceramic heaters and PTC heaters, our products showed excellent heat generation with only 1/3 power consumption. UD pursues significant energy consumption for nature and people. Introducing Hience-F and Hience-U/SU.

Flexible Heater

Hience-F Series

They are flexible heater with excellent conductivity and high thermal efficiency. We produce them using our hybrid graphene, and the exterior is applied with polyimide. They are excellent in heat resistance, and easy to be applied to devices that require dynamic changes multiple times due to the characteristics of graphene and film type. They show stable heating efficiency even in a curved state.

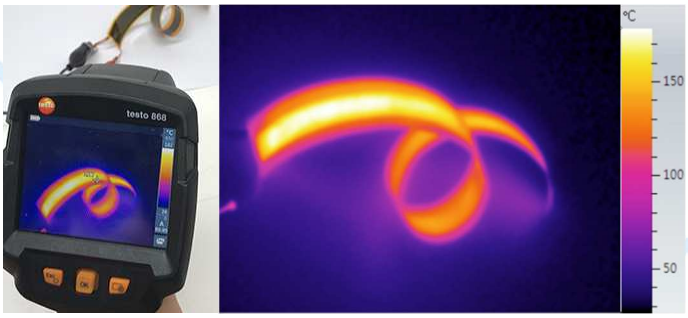
Characteristics

Unit frame: Polyimide
Board area(㎜): Various, Customizing
Heating area(㎜): Various, Customizing
Shape: Square/Line
Recommend temperature: ~ 150℃
Maximum available temperature: 200℃

Recommended for use

Fuel cells
Displays
Electronics
Curved devices
Shell
Pipe heating
etc.

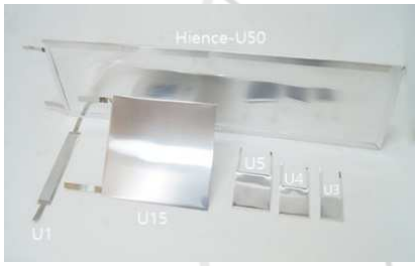
Unit name	Size (㎜)	Heating area (㎜)	Shape	Vol (V)	Power (W)	Temp (℃)
Hience-F3	30x30x0.2	30x30x0.2	Square	34.3	4.1	180
Hience-F4	40x40x0.2	40x40x0.2	Square	45	7.5	180
Hience-F5	50x50x0.2	50x50x0.2	Square	54	11	180
Hience-F120	10x200x0.2	10x200x0.2	Line	16	13.6	180



Al Plate Heater

Hience-U Series

As graphene planar heating units coated with Al, they have an excellent temperature uniformity and a large heating area, so they are advantageous to maintain efficiency compared to conventional coil heaters.
Since the heat source themselves are film type, they have a structural advantage that can be thinned structurally and are not greatly limited by their shape.
Lighter and more durable than conventional heaters.
In actual use, they are more resistant to thermal shock than conventional ceramic heaters. Because of no oxidation, there is little damage to the heater and long life. In case of conventional carbon heaters or graphene heaters, it was difficult to use at high temperature because of the binder. However, our planar heating devices generate heat of over 400 ℃ through a binder developed with know-how.
They are efficient heating elements manufactured and produced in various shapes and sizes and consume only 1/3 of the power consumption compared to the existing power consumption.



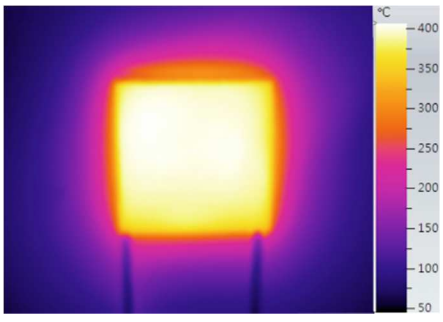
Characteristics

Unit frame: Aluminum
Board area(㎜): Various
Heating area(㎜): Various
Shape: Plate/Industrial DIY

Recommended for use

Heating machine, Heater/Warmer, Dryer, Industrial PTC heater, Electric vehicle heater, Industrial boiler, Air/Water heater, Large dryer, Warm air blower/Injection/Molding machine, Heating bonding equipment, etc.

Unit name	Size (㎜)	Heating area (㎜)	Shape	Vol (V)	Power (W)	Temp (℃)
Hience-U3	30x30x1.5	30x30	Plate	9	21	400
Hience-U4	40x40x1.5	40x40	Plate	12.5	31	400
Hience-U5	50x50x1.5	50x50	Plate	17	47	400
Hience-U212	20x120x1.5	20x120	Plate	30	38	400
Hience-U1512	150x120.5x2	150x120.5	Industrial DIY	210	265	400
Hience-U5012	500x120.5x2	500x120.5	Industrial DIY	210	800	400



Stainless Plate Heater

Hience-SU Series

Are graphene planar heating elements that realizes 600 °C using a stainless cover.
Existing heating materials for stably implementing 600 °C are not only expensive materials such as tungsten or silicon carbide, but they also have unsatisfactory heating efficiency and have problems with electrode oxidation.
The platinum heater that appeared to solve this problem also has a price problem.
We manufacture and produce them in various shapes and sizes and as efficient heating components that consume only 1/3 of the power consumption compared to the existing power consumption.

Characteristics
Unit frame: Stainless
Board area(㎜): Various
Heating area(㎜): Various
Shape: Plate/Industrial DIY

Recommended for use
Electronic appliance parts:
Hot plate, induction, Oven, Heating machine, Heater/Warmer, Dryer
Industrial electronic components:
Industrial PTC heater, Electric vehicle heater, Industrial boiler, Air/Water heater, Large dryer, Warm air blower/Injection/Molding machine, Heating bonding equipment, etc.

Unit Name	Size (㎜)	Heating Area (㎜)	Shape	Vol (V)	Power (W)	Temp (℃)
Hience-SU3	30x30x1.5	30x30	Plate	15	36	600
Hience-SU4	40x40x1.5	40x40	Plate	18	65	600
Hience-SU5	50x50x1.5	50x50	Plate	28	87	600

Module

We developed a module for warm/hot air to make it easier to use heater units with excellent thermal efficiency. It can cope with the use of PTC heater used in existing hot/hot air electronic devices.

Block Heater Module

It is a heater module designed to generate heat efficiently and designed with spatial calculation and stability.
Hience-M consumes only 1/3 of the power consumption compared to the previous one.
It is designed to expand/connect modules in 3 axes.

Characteristics

Unit frame: Plastic
Board area(㎜): 130x110x30(t)
Shape: Rectangular

Recommended for use

Electronic heating module:
Heating machine, Heater/Warmer, Dryer
Industrial product heating module:
Electric vehicle heater, Air heater, Boiler,
The advanced heating solution, Heating membrane

Unit Name	Size (㎜)	Shape	Vol(V)	Power(W)	Temp(℃)
Hience-M13	130x110x30	Rectangular	220	500	400

Heating effect test

Wind Speed	Power(W)	Wind Temp(℃)
1.5~2.0 m/s	400	130
2.5~3.0 m/s	400	90
3/0~3.5 m/s	400	80

SnO_2 for Gas Sensing

Graphene + SnO_2 composite For NO_2 Gas Sensing

Description

In general, SnO_2 is all thing of the sensor material for NO_2 gas sensor, our products have graphene functionalized structure on the SnO_2-Sn:core-shell structure that has changed the work function and the bandgap of SnO_2.
Although the existing sensor operating temperature was over 200 °C, our composite structural design allows the sensor to operate at room temperature. At the same time, electrical barriers between grain boundaries are reduced to reduce electrical signal noise or loss.

Recommended for use

Sensing device
Composite for elements of NO_2 sensor
NO_2 gas sensing as a sensor material for air
Biomedical
Light-emitting element (Green)
Photo lumine/Electro lumine sensor element
Semiconductor element (Via customizing)
Soldering material - 3D printing (Via customizing)

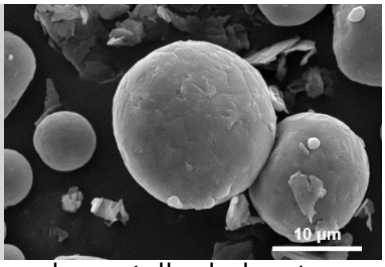
Reference

Molecular group system as one energy unit, Ceramics International 45 (2019) 9858–9865.
Fast semiconductor-metal bidirectional transition by flame chemical vapor deposition, ACS Omega 4 (2019) 11824-11831.
Synthesis of Au/SnO_2 nanostructures allowing process variable control, Scientific Reports 4 (2020) 346.
Interface treatment using amorphous-carbon and its applications, Scientific Reports 10 (2020) 4093.

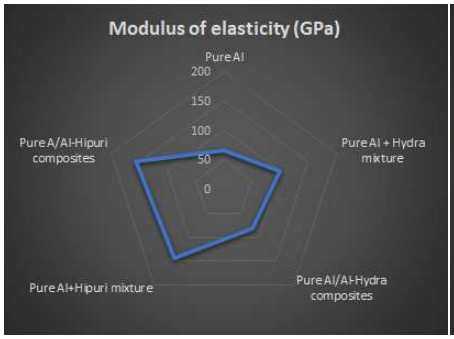
Metal Casting Materials

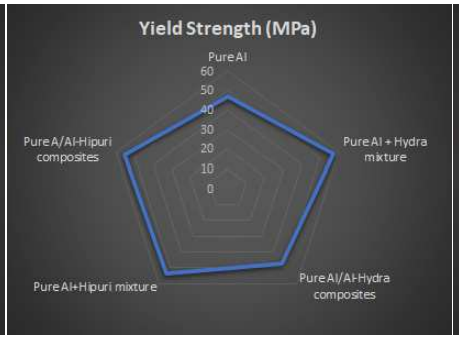
Graphene Metal Casting Materials

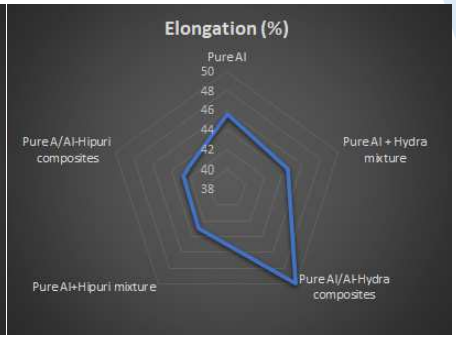
Graphene Pure Aluminum



Hi-puri & Hydra are our hybrid graphene with excellent dispersibility, electrical properties, and thermal conductivity characteristics. They are produced by our hybrid method.
Hi-puri & Hydra Al mixture/composite that will solve the problem of aluminum carbon coating, which has been talked about as a difficult issue.
They can be used in automobiles and aviation and be applied to a variety of aluminum products used in construction and our daily lives.
our graphene and aluminum powder mixture/composite are prepared as casting materials or metal additives.



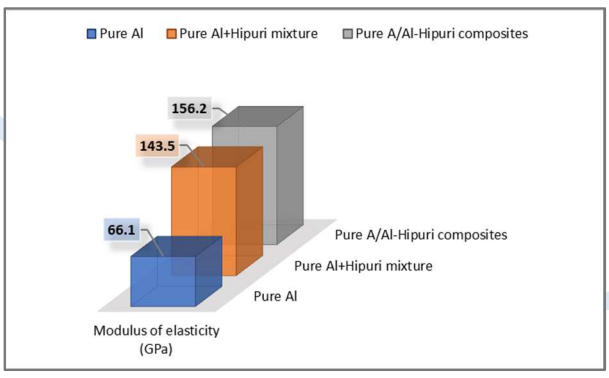


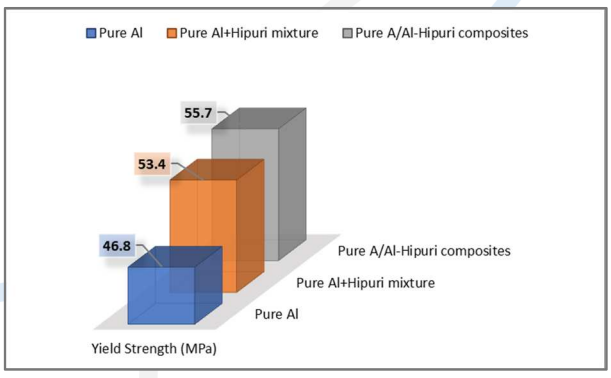


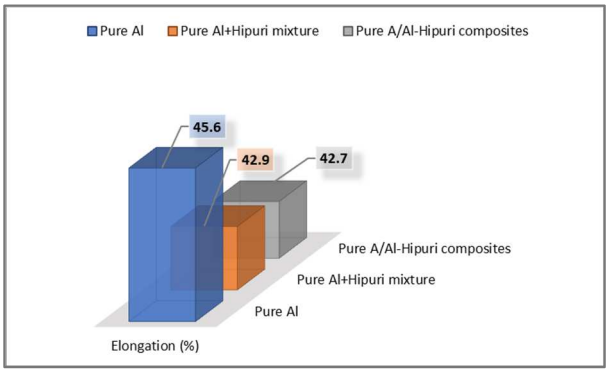
Hi-puri Al Mixture, Hi-puri Al Composite

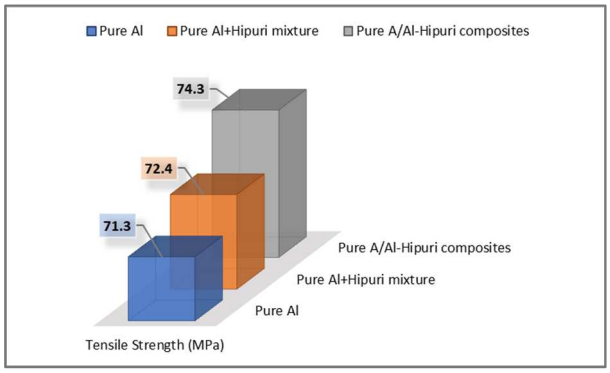
Particle size: 21 ㎛ (D_{50})

As a casting material that can mass-produce graphene-metal alloy.
Our company has the technical ability to control the hydrogen content in the aluminum mixture casting and composite casting and to control the properties of the alloy when casting the alloy based on this.





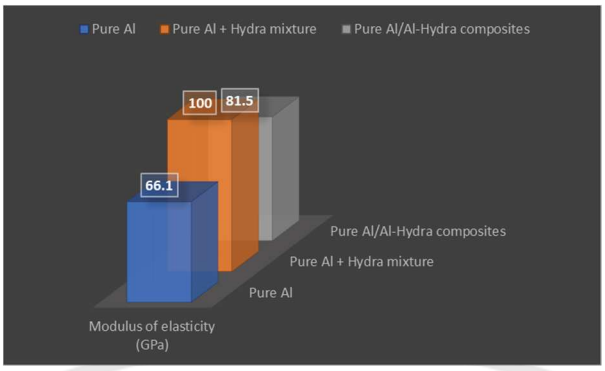


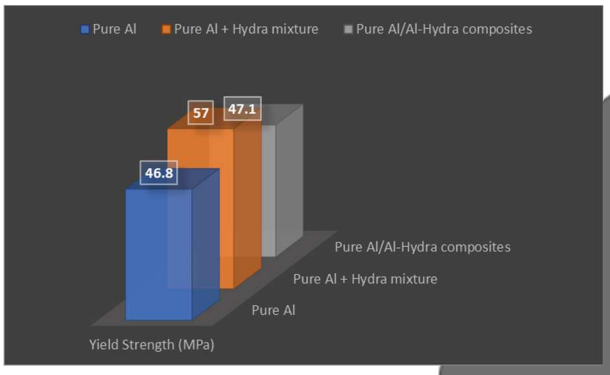


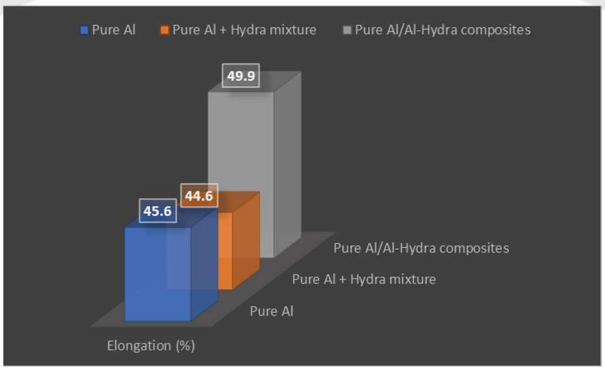
Hydra Al Mixture, Hydra Al Composite

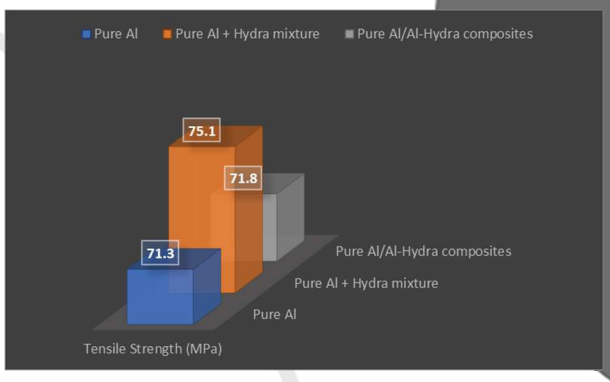
Particle size: 21 ㎛ (D_{50})

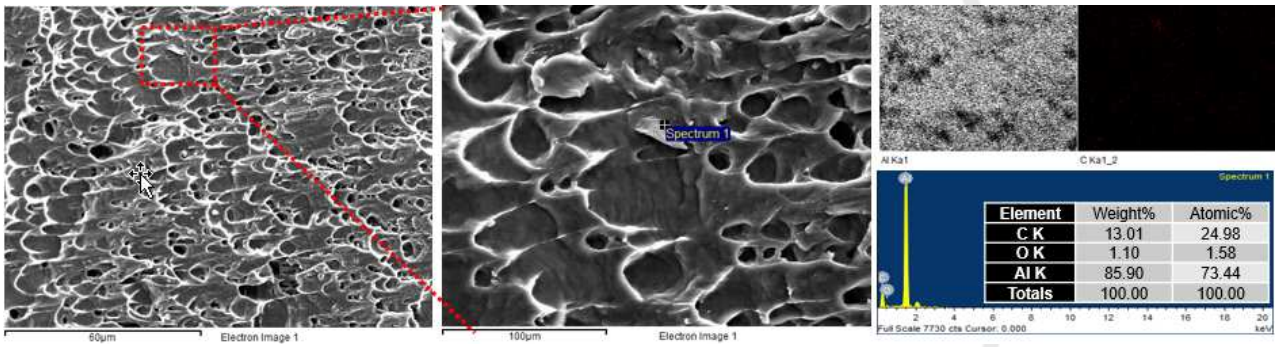
As a casting material that can mass-produce graphene-metal alloy.
Our company has the technical ability to control the hydrogen content in the aluminum mixture casting and composite casting and to control the properties of the alloy when casting the alloy based on this.











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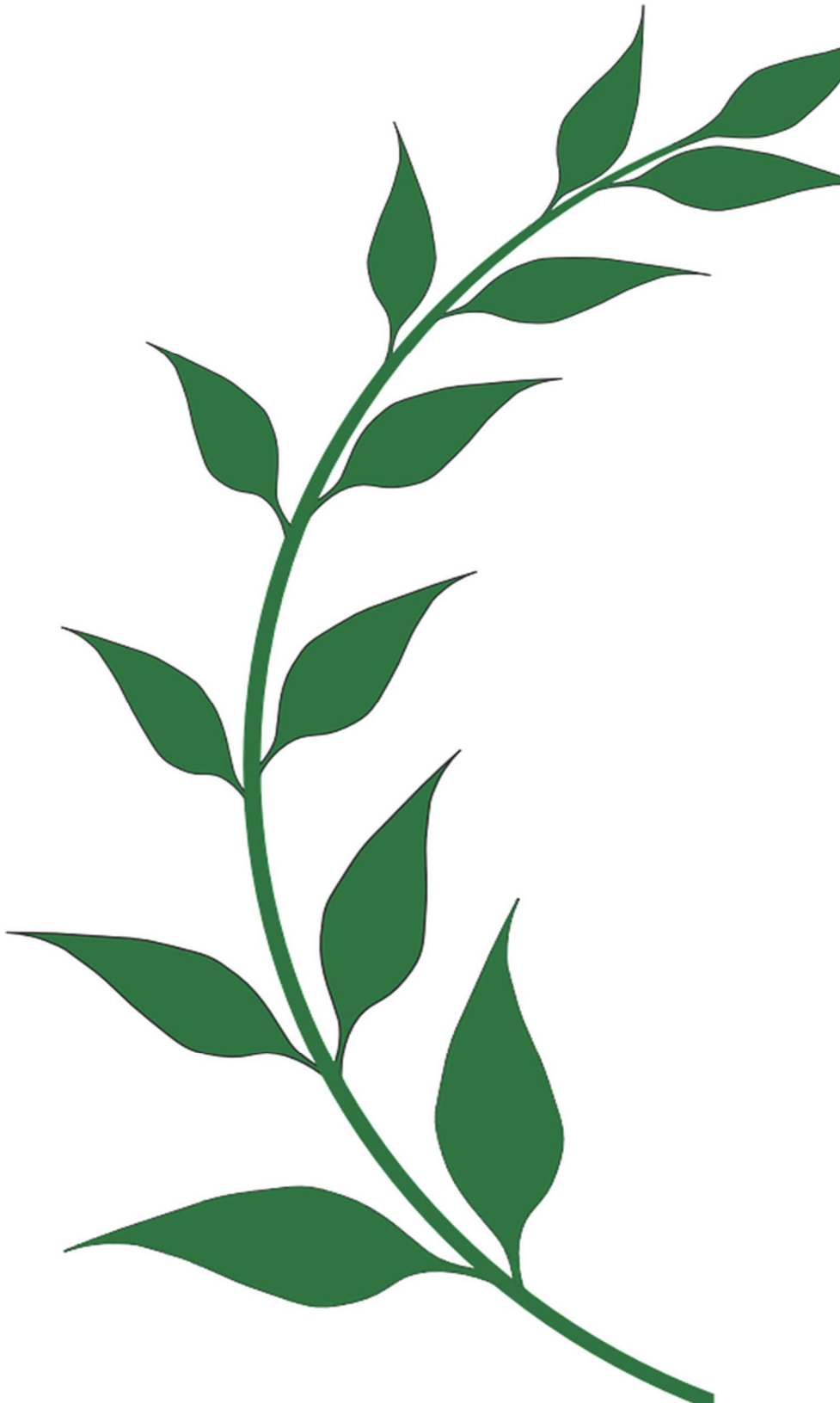

Energy wave comes!

We love to keep &
help nature & people
with our technology.
Good energy effect
needs for our life!

UD COPORATION