New Graphene – Hi-puri, Hydra – Excellent applicability/dispersion
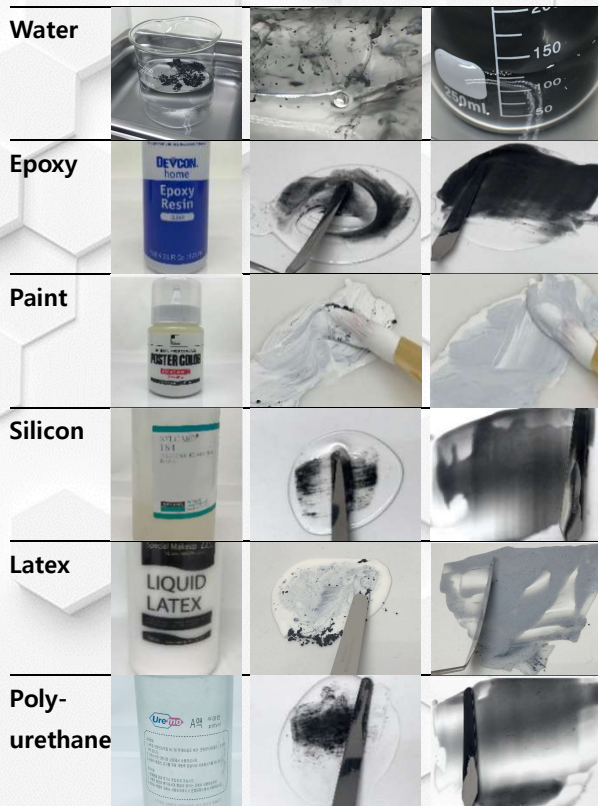
There are various types of graphene, such as GNP (graphene nanoplate), GO (graphene oxide), rGO (reduced graphene), and non-oxidized graphene. Different types have different characteristics and prices. Commonly, there is a problem of dispersion and a problem of price/performance.

Water

Epoxy

Paint

Silicon

Latex

Poly-urethane

In order to solve this problem, UDerive Co., Ltd. has developed Hi-puri with high expected properties and Hydra that can give new functions through hydrogen. Hi-puri is mass-produced by dividing classes into various performances and price points suitable for industrial groups.

As shown in the figure, you can see that dispersion is well done with only a brush or a pallet knife in various solvents

In the past, non-oxidized graphene and functionalized GNP/GO/rGO were developed to increase dispersibility but the degree of dispersion increases through functional groups such as amine groups, flow groups, and carboxyl groups, while the expected properties decrease. Additional distributed work is required for application.

Hi-puri and Hydra are produced through a hybrid process that combines the chemical and mechanical methods in the exfoliation process and hydrotreatment and high temperature treatment in the reduction process.
They are new graphene that are well dispersed without a dispersion agent and have better properties than GNP, GO, and rGO, and competitive.

Hi-puri and Hydra are hybrid graphene with excellent applicability and freedom to disperse in most solvents by allowing energetic self-assembly through hydrogen functional groups to be free from surface energy.

According to the self-test using UD's conductive paste, Hi-puri Class 1 showed 400% improvement in performance compared to High-quality Carbon.

In addition, you can check the basic properties improvement and applicability from UD paints, pastes, and inks applied with Hi-puri.
You can see that graphene is evenly dispersed and coated on the fracture surface of the plate coated with UD's conductive ink Hicon-V through the photo.

Conductivity chart comparing HI-QURITY CARBON, HI-PURI CLASS 9, HI-PURI CLASS 4, HI-PURI CLASS 1 (%)
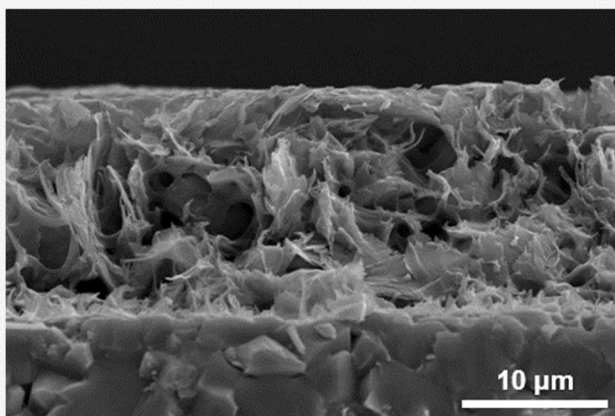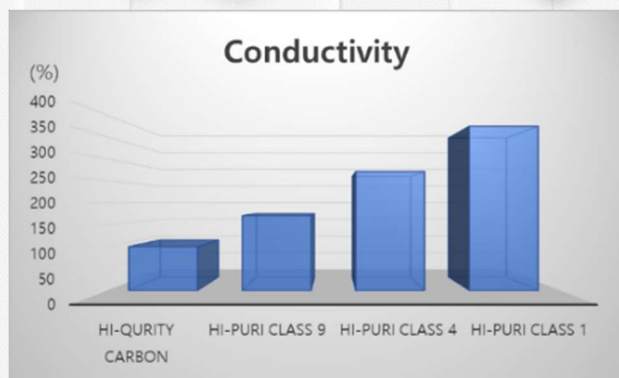
UD's Hybrid Graphene can be used as an additive for improving function. Even in electroplating, the properties of the plating layer could be changed by adding a very small amount of (less than 1%) Hi-puri.

10 µm

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UDerive
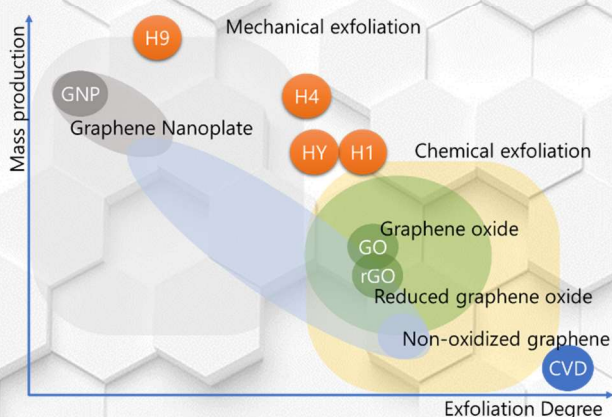
We were able to increase the dispersibility and the expected properties through the low-temperature hydrogen treatment and the high-temperature hydrogen treatment.
And various product lines are organized as shown in the graph and table below to suit the price and properties required by the industrial group.

Hi-puri Class 9 has higher performance than GNP.
GNP is graphene with a low price point because of its high mass production, but it did not show a big difference in dispersibility and properties compared to a high level of carbon due to its low properties.

Hi-puri Class 1 has similar properties to reduced graphene, has excellent dispersion, and is mass-produced at a price of 1/4 of that.
Although oxidation/reduction graphene has high quality, we tried to overcome the problem that it was not properly evaluated in the actual industry due to the problem of high price and dispersibility.

Hi-puri Class 4 has 70~80% of Class 1's performance so that good graphene can be used in a wider and more diverse industry. It is offered at the price of high-priced GNP and low-cost graphene oxide and has been developed to have superior performance.
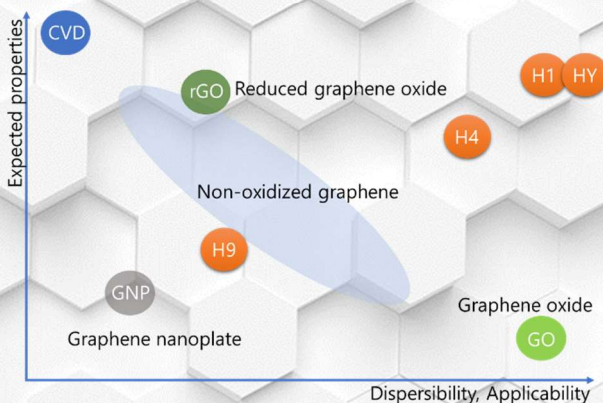
Hydra is developed with hydrogen interposed between the edges or layers and is designed to induce changes in the properties of the applied base.

		Particle size (D_{50}, μm)	Thickness (nm)	Layers	Elements (at%)				
					C	O	N	S	H
H1	Hi-puri class 1	4.975	≤2	1~8	≥99	≤0.95	-	≤0.05	-
H4	Hi-puri class 4	6.469	≤5	1~20	≤99	≤1	-	-	≤1
H9	Hi-puri class 9	8.064	No data		≥99	≤1	-	≤0.05	-
HY	Hydra	6.108	≤5	1~20	≥92	≤5	-	-	≤3

Through graphene,
You can expect improvement in *conductivity, mechanical strength, chemical resistance, corrosion resistance, adhesion, interfacial strength and abrasion resistance.*

With UD's graphene

Additives — **Stirring time** — **The burden of applicability**
Shortened

Expected properties — **Productivity** — **Quality uniformity** — **Satisfaction**
Improving