

大片径氧化石墨烯

产品说明



专注研发，只为更高品质

一、产品概述

1. 昂星新碳开发的大片径氧化石墨烯 (Large-size Graphene Oxide) 简称LGO。
2. LGO系列产品均含有丰富的含氧官能团, 可溶于H₂O、NMP、DMF、乙二醇等溶剂, 同时在乙醇、THF等溶剂中有着优异的分散性能。
3. LGO系列产品具有片径尺寸大、浆料粘度大、纯度高、分散性好等优点, 可广泛应用于纺丝材料、成膜材料、包覆材料、隔热材料等领域, 适合于科研院所等研发单位及企业使用。

二、产品参数

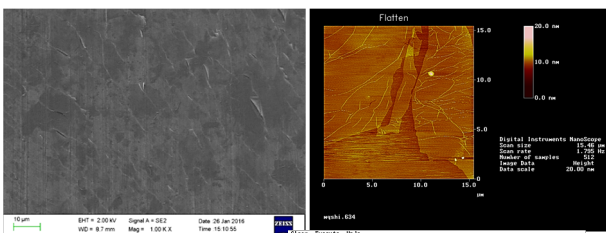


图1. 昂星LGO产品的SEM和AFM图

产品编号	LGO 1111	LGO 1121	LGO 1131
形态	粉体	浆料	分散液
颜色	棕黄色	棕黄色	棕黄色
厚度 (nm)	~1	~1	~1
单层片径 (μm)	5~40	5~40	5~40
可剥离率/单层率 (%)	>95	>95	>95
碳含量 (wt.%)	~42	~42	~42
氧含量 (wt.%)	~54	~54	~54
硫含量 (wt.%)	<1.5	<1.5	<1.5
灰分 (wt.%)	<1.0	<1.0	<1.0
比表面积 (m ² /g)	~207	—	—
颗粒度 (mesh)	<80	—	—
浓度 (mg/ml)	—	15 (可定制)	0.5~5 (可定制)

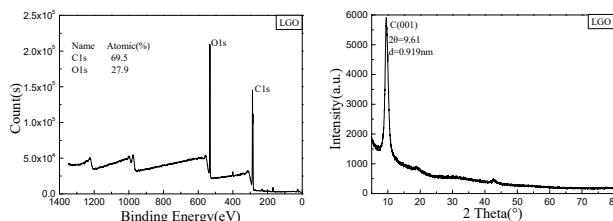


图2. 昂星LGO粉体 XPS分析和XRD分析

三、产品性质说明

1. 保持大片径特性: LGO使用超声分散设备 (尤其是杆式超声设备) 进行剥离时, 会在一定程度上导致LGO片层破裂, 片径尺寸相应减小。因此, 建议使用机械搅拌等相对温和的剥离处理方法。
2. LGO系列产品与GO系列产品的区别: LGO系列产品具有更大的片径尺寸, 所以粉体在配制为溶液时粘度比较大, 通过Brookfield粘度仪测试, 粘度值是GO系列产品的5倍。



图3. 昂星LGO宏观粘度

3. pH测试: 采用Hummers法等化学氧化法制备LGO系列产品过程中, 需要对强酸性的浆液进行多次洗涤。但是在上层滤液接近中性的情况下, LGO分散液依然会呈酸性, 这是由于LGO系列产品本身含有-COOH结构。

浓度 (mg/ml)	pH值	浓度 (mg/ml)	pH值
0.1	4.10	3.0	2.25
0.5	3.23	5.0	2.02
1.0	2.88	10.0	1.85
2.0	2.47		

以上产品之物性仅供参考, 不作为本公司出货承诺书或验收准则。以上所提供的数据仅为一般通用信息, 为目前我方所了解的资料。因该产品适用及应用范围新而广, 有些甚至超出我方掌控, 因此, 即使我方没有考察到实际应用中的全部必要信息, 我方也不负任何责任。本公司保留改善产品参数之权利, 最终解释权归本公司所有。

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四、应用情景举例

石墨烯纤维

利用LGO系列产品的液晶和大片径特性，通过溶液纺丝可以获得LGO纤维，再经过还原便可获得还原LGO纤维。高的强度、电导率和比电容使得该材料有可能应用于高强度纤维、可穿戴设备等领域。其他组装方法也可以获得石墨烯纳米纤维材料。

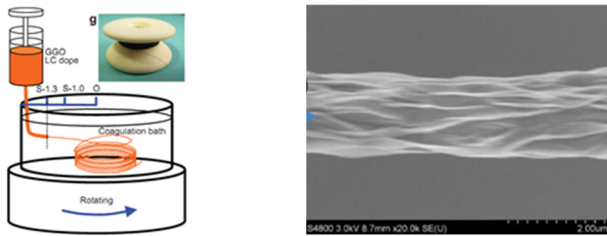


图4. 昂星LGO系列产品制备石墨烯纤维示意图

五、保存技术

粉体和气凝胶：室温下密闭保存（ $< 30^{\circ}\text{C}$ ），保存时请勿与金属、维生素C、 NaHSO_3 、 NaBH_4 等还原性试剂接触。开封后请低温密闭保存，并尽量于3-6个月内使用完毕。

浆料和分散液：低温下阴凉处密封保存（ $< 20^{\circ}\text{C}$ ），保存时请勿与金属、维生素C、 NaHSO_3 、 NaBH_4 等还原性试剂接触。产品开封后应低温密闭保存（不可结冰，结冰亦会对层间水产生影响），并尽量在3-12个月内使用完毕（若满足上述保存条件，保质期可达3年）。

六、品质检测

为了让客户获得最佳品质的LGO系列产品，昂星新碳建立了严格的出厂检验机制，确保在售产品均处于最佳性能状态。

七、注意事项

使用安全：在高温下LGO粉体产品容易发生热解式爆炸，而且对粉体的研磨、撞击等加工也可能产生爆炸反应，请务必做好相关条件下的安全防护。粉体对人体的肺及呼吸道有害，使用过程中请做好相应的粉尘防护。浆料有一定酸性，使用时请避免与皮肤直接接触。

贮存运输：粉体包装瓶为PS材质，浆料包装瓶为PP材质，请远离热源。请勿与有机溶剂接触。

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如果对上述内容存在任何疑问或需要相关文献，欢迎联系我们：Sales@ashinecarbon.com

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Large-size Graphene Oxide

Product Information



ASHINE
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I. Product Overview

1. The Large-size Graphene Oxide developed by Ashine is referred to as 'LGO' for short.
2. LGO series products are rich in oxygen-containing functional groups, soluble in H₂O, NMP, DMF, ethylene glycol and other solvents, and have excellent dispersion properties in ethanol, THF and other solvents.
3. With such advantages as a large size, high slurry viscosity, high purity and good dispersibility, LGO series products can be widely used in spinning materials, film-forming materials, cladding materials, thermal insulation materials and others, making them suitable for research institutes and other R&D units and enterprises.

II . Product Parameters

Product Number	LGO 1111	LGO 1121	LGO 1131
Form	Powder	Slurry	Dispersion
Color	Brownish yellow	Brownish yellow	Brownish yellow
Thickness (nm)	~1	~1	~1
Monolayer diameter (μm)	5~40	5~40	5~40
Exfoliation rate (%)	>95	>95	>95
Carbon content (wt.%)	~42	~42	~42
Oxygen content (wt.%)	~54	~54	~54
Sulfur content (wt.%)	<1.5	<1.5	<1.5
Ash content (wt.%)	< 1.0	< 1.0	< 1.0
BET (m ² /g)	~207	—	—
Grain size (mesh)	< 80	—	—
Concentration (mg/ml)	—	15 (Customizable)	0.5~5 (Customizable)

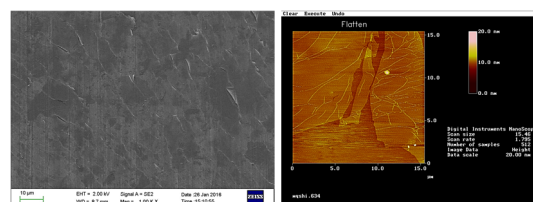


Fig. 1. SEM and AFM Images of Ashine LGO Products

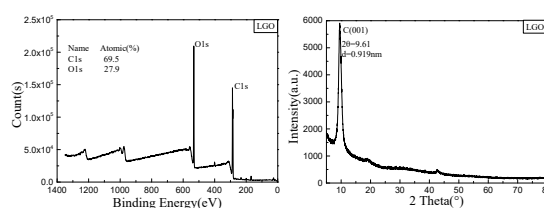


Fig. 2. Ashine LGO Powder XPS Analysis and XRD Analysis



Fig. 3. Ashine LGO Macroscopic Viscosity

III. Description of Product Properties

1. **Retention of large size:** When some ultrasonic dispersion equipment (especially rod-type ultrasonic equipment) is used to peel LGO, it will lead to the fracture of LGO lamellae to a certain extent and decrease of the size accordingly. As such, it is recommended to use a relatively mild peeling process method such as mechanical agitation.
2. **Difference between LGO series products and GO series products:** LGO series products have a larger size, so the viscosity is greater when the powder is turned into the solution. Tested by using a Brookfield viscometer, the viscosity is 5 times stronger than that of the GO series products.
3. **pH test:** In the process of preparing LGO series products through such chemical oxidation methods as the Hummers method, the strong acid slurry needs to be washed many times. However, in the case of upper filtrate close to neutralization, the LGO dispersion will remain acidic because the LGO series products contain the -COOH structure themselves.

Concentration (mg/ml)	pH value	Concentration (mg/ml)	pH value
0.1	4.10	3.0	2.25
0.5	3.23	5.0	2.02
1.0	2.88	10.0	1.85
2.0	2.47		

Properties of the above mentioned products are for reference only, and shall not be regarded as shipment commitment or acceptance criteria of the Company. All data provided above is general information we have learned as far. Due to new and wide application of the product, some even beyond our control, we will not bear any responsibilities in case we have not considered all necessary information in actual application. The Company reserves the right to improve product parameters as well as the final right of interpretation.

Large-size Graphene Oxide

Product Information



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IV. Application Example

Graphene Fibers

By using the characteristics of liquid crystal and the large size of LGO series products, LGO fibers can be obtained through solvent spinning and reduced LGO fibers can be obtained by reduction. High strength, conductivity and specific capacitance make it possible for the material to be used in high strength fibers, wearable devices and other fields. The graphene nano-fiber material can be obtained by other assembly methods.

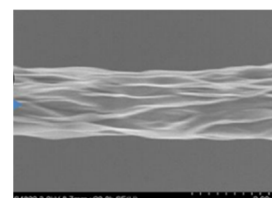
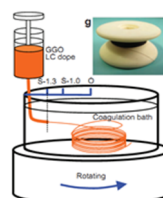


Fig. 4. Schematic Diagram of Graphene Fibers Prepared by Ashine LGO Series Products

V. Preservation Technology

Powder and aerogel: Keep it airtight at room temperature (less than 30 °C). Keep it away from reductive reagents such as metals, vitamin C, NaHSO₃ or NaBH₄ when it is stored. Please store it at low temperature after unsealing and it should be used up within 3-6 months.

Slurry and aqueous dispersion : Keep it in a cool place at a low temperature (less than 20 °C). Keep it away from reductive reagents such as metals, vitamin C, NaHSO₃ or NaBH₄ when it is stored. The product should be stored at a low temperature after unsealing (freezing is not allowed otherwise the interlayer water will be affected), and it should be used up within 3-12 months (if the above storage conditions are satisfied, the shelf life can be 3 years).

VI. Quality Inspection

In order to provide customers with LGO series products of the best quality, Ashine has established a strict factory inspection mechanism to ensure that its products on sale give the best performance.

VII. Notice

Safe use: At a high temperature, LGO powder products are prone to pyrolysis explosion, and such processes as powder grinding and impacting may also cause an explosive reaction. Please ensure safety protection under the relevant conditions. The powder is harmful to the lungs and respiratory tract of the human body, so please ensure corresponding dust protection when being used. The slurry has a certain acidity, so please avoid direct contact with the skin when being used.

Storage and transportation: Powder packaging bottle for PS materials, slurry packaging bottle for PP materials. Please keep away from heat sources and organic solvents.

This manual is a brief product description. Please visit the company's website at www.ashinecarbon.com to view and download a detailed product description. If you have any questions about the above or require the relevant literature, please contact us at Sales@ashinecarbon.com.

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