



Biodegradable Material Solutions

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Product Introduction

Kinpoly Advanced Materials Co., Ltd.

Kinpoly Advanced Materials Co., Ltd. is mainly engaged in the R&D, production, and sales of biobased and biodegradable modified materials, and committed to providing customers with high-performance, cost-effective, and functional ecofriendly material overall solutions. At present, the company's biodegradable products are mainly used in products such as straws, film bags, sheets, thermoforming, injection molding, and 3D printing.

The company is a wholly-owned subsidiary of Pliith Biotechnology Co., Ltd. and has formed an industrial chain synergy from polymerisation to modification relying on the PLA products of Pliith, so as to provide the market with a more complete overall solution of biodegradable materials and create a green living environment for human beings.



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■ Energy consumption



■ White pollution



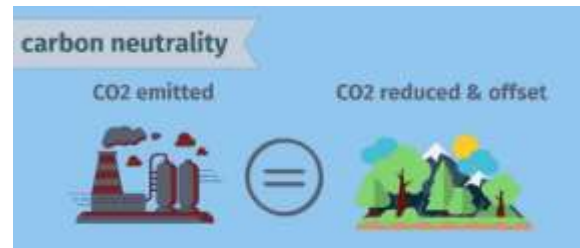
■ Microplastic pollution



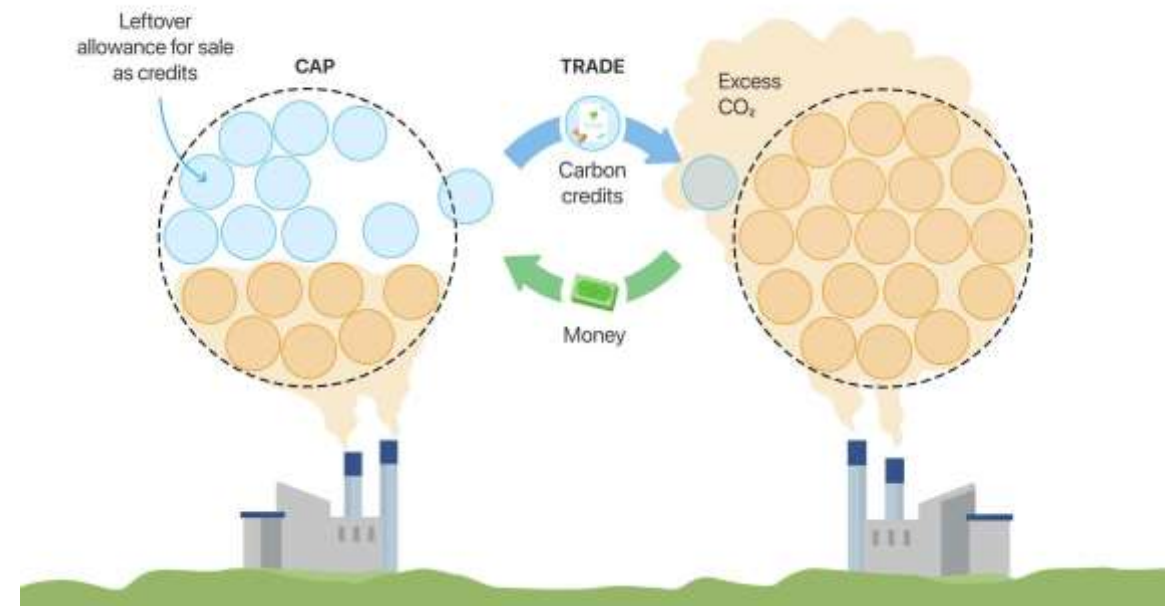
II. Industry background: Plastic ban, Regulations



- ✓ **Target 2030: at least 40 percent reduction in greenhouse gas emissions**
- ✓ **Target 2050: climate neutrality, an economy with zero greenhouse gas emissions**



- ✓ **Target 2030 : Achieve carbon peaking**
- ✓ **Target 2060: Carbon neutral**



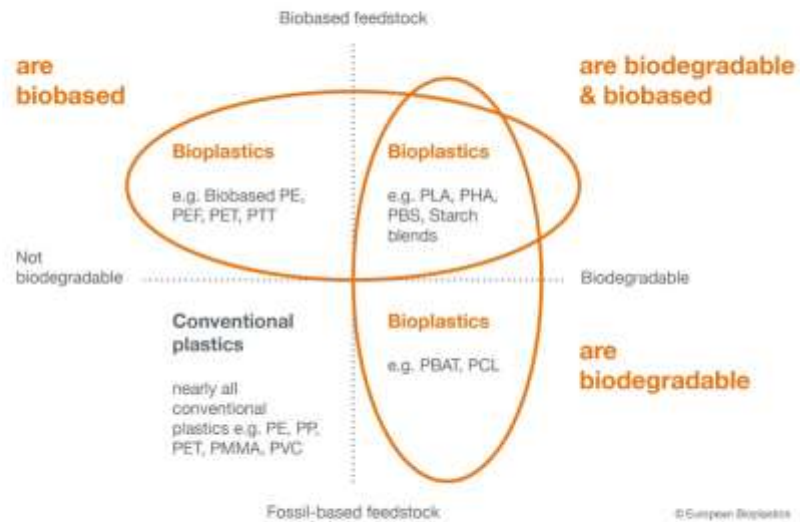
II. Industry background: biodegradable materials

Biodegradable plastics (biodegradable plastics), GB/T 20197 stipulates: plastics that are degraded by the action of microorganisms existing in nature and eventually completely degraded into carbon dioxide (CO₂) or/and methane (CH₄), water (H₂O), and the mineralised inorganic salts of the elements contained therein, as well as new biomass in the natural world, such as in the soil and/or in sandy soils, etc., and/or in specific conditions, such as in the conditions of composting, or under the conditions of anaerobic or aqueous culture solution.

- Bio-based plastics don't have to be biodegradable
Biodegradable plastics do not have to be bio-based

Material coordinate system for bioplastics

Bioplastics are bio-based, biodegradable, or both.



Source: Institute for Bioplastics and Biocomposites (IBB) and European Bioplastics (EUBP)

© European Bioplastics

- Biological materials are renewable biomass resources that are formed by photosynthesis.
By using biological fermenting technology, biological products are converted into biomedical polymer composites that are environmentally friendly and safe.
- Bio-based degradable materials can be decomposed into CO₂ and H₂O under microorganisms or under compost conditions.

Global Biodegradable Product Distribution

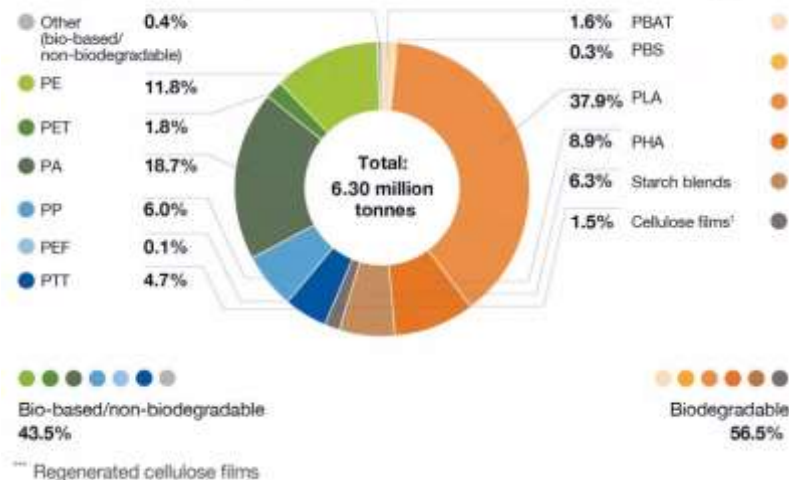
Global production capacities of bioplastics in 2022 (by region)



Source: European Bioplastics, nova-Institute (2022). More information: www.european-bioplastics.org/market and www.bio-based.eu/markets

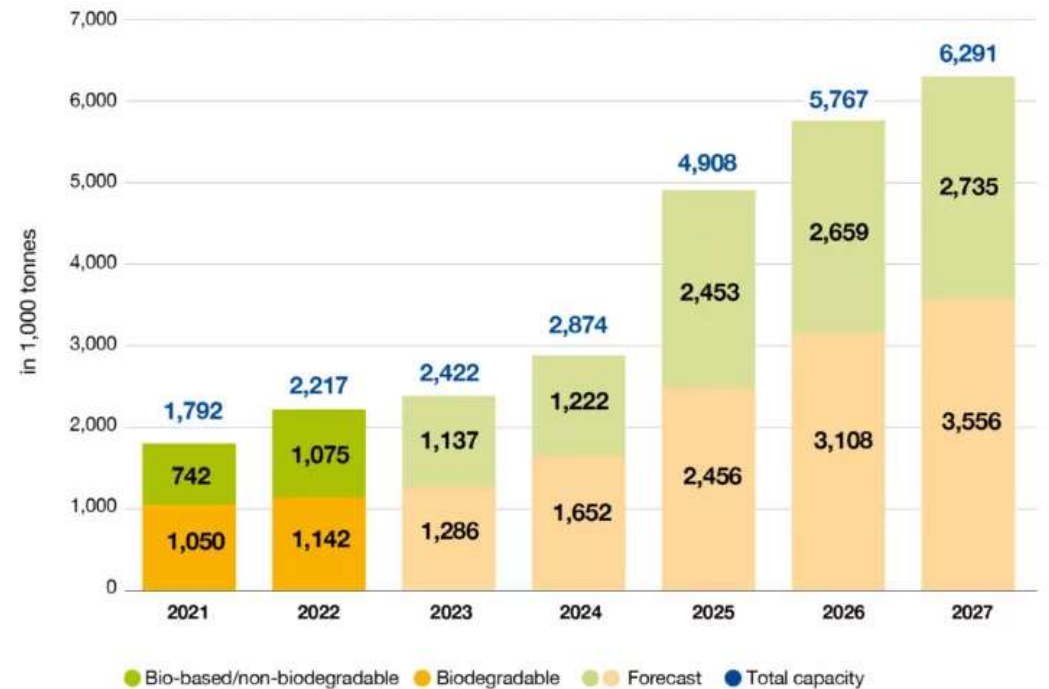
Projected global biomaterials capacity in 2027

Global production capacities of bioplastics 2027 (by material type)



Biodegradable Materials Demand 2021-2027

Global production capacities of bioplastics



Source: European Bioplastics, nova-Institute (2022). More information: www.european-bioplastics.org/market and www.bio-based.eu/markets

Biodegradation rate > 90%, in accordance with ASTM D6400, EN 13432, GB/T 20197.



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Kinpoly is committed to providing targeted biodegradable material solutions based on customer requirements and application scenarios.

Straws



Injection molding



Film & Bags



Thermo-forming



3D Printing



III. Product line: certificates

CERTIFICATE for Resins

THIS IS TO CERTIFY that the following Items have been found to comply with the specifications established in the American Society for Testing and Materials standard ASTM D6400 and/or D6868 in accordance with the terms and conditions of the "International Biodegradable Products Institute, Inc. Licensing & Certification Program for Compostable Products":

- * HD900 Resin, max thickness 4.77 mm [20210810-02]

as further described in the application and related information submitted to the Biodegradable Products Institute by Orisko Advanced Plastics Co., Ltd. (the "Licensee") a corporation of China.

Specific items associated with these certifications can be found on the BPI Product Catalog: <https://products.bpiworld.org/composites/orisko-advanced-plastics-co-ltd>

This approval is for a Resin only, and cannot be used for claims in a finished product. Manufacturers and converters using these items to manufacture other products must seek a separate International Biodegradable Products Institute, Inc. certification in order to use the International Biodegradable Products Institute, Inc. Certification Marks or claim such certification.

This Certificate authorizes the Licensee to use the Certification Program Logo depicted below in relation to such items, subject to all conditions and terms of the Program Rules and the License Agreement between the Biodegradable Products Institute and the Licensee.



Dr. *David Yip*
BPI Executive Director
Valid until: October 31, 2024
Certificate #: 10529239-1

BPI Biodegradable Certification

NOTIFICATION OF REGISTRATION

Holder	Orisko Advanced Plastics Co., Ltd Luhua Road, Boyan Science Park, No. 2, Gaoxin District Hefei 231202 ANHUI CHINA
Product	Compostable material
Type, Model	04-0507 19000
Testing basis	GB 19131-2008-12 ASTM D 6400-2019-01 Certification scheme: products made of compostable materials (2020-41)
Mark of conformity	
Registration No.	78047
Valid until	2027-01-31
Right of use	With this notification of registration the holder is granted the special entitlement for advertising purposes according to §8 (5) of the Regulation governing Use of the Mark and the Trademark (Usage Conditions for the mark of conformity shown above in conjunction with the specified registration number. See annex for further information.

2023-09-10
S. Sey
Head of Certification Body

DINCERTCO Biodegradable Certification

CERTIFICATE

Certificate holder	Orisko Advanced Plastics Co., Ltd No. 2 Luhua Road, Boyan Science Park, Gaoxin District, Hefei City, 231202 ANHUI CHINA
Product	Reduced products
Type, Model	Low Carbon Materials-01000-0
Testing basis	Certification scheme - Reduced products (2020-45) ASTM D 6868-02C
Mark of conformity	
Registration No.	80271
Valid until	2028-09-11
Right of use	This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number. See annex for further information.

2023-09-10
K. Volny
Head of Certification Body

Low carbon Certification

检测报告

报告编号: A1220190209010000381

检测机构名称: 华测检测
地址: 广东省广州市天河区岑村沙涌大道1号

以下测试之样品送样品由送样者提供并确认

样品名称	PLA 刀叉餐具
样品型号	Z100340304
材料	PLA (聚乳酸) / PLA (聚L-丙氨酸)
样品颜色	白色
样品规格/尺寸	3022.08.26
样品检测日期	2022.08.26-2022.08.24

测试内容:
依据客户的中餐餐具, 具体项目见以下一表。

检测标准:
依据GB 4806.7-2016 食品安全国家标准 食品接触用塑料材料及制品的食品安全。

2022年8月24日
任丰
任丰

Food Safety Test Report

PBAT/Starch series blown film materials

Items	M1000-1	M2000	M2000-1
Melt flow rate (g/10min)	2-4	2-4	2-4
Density (g/cm ³)	1.28~1.32	1.28~1.32	1.28~1.32
Longitudinal tensile strength (MPa)	≥18	≥23	≥23
Longitudinal elongation at break (%)	≥350	≥350	≥350
Composting performance	Home compost, industrial compost	Industrial compost	Industrial compost
Stiffness	good	excellent	excellent
Ageing resistance (double 60 aging 12 days)	good	good	excellent
Colour	Milky white	Milky white	Light khaki
Heat sealing performance (bottom sealing force)	≥10N/15mm	≥10N/15mm	≥10N/15mm
Implementation standards	GB/T38082-2019, ASTM D6400, EN13432, GB20197		
Fields of application	Supermarket shopping bags, garbage bags, pet poop bags		
Typical blown film process	Processing temperature 140-150°C		



Supermarket shopping bags



Trash bag



Double-60 aging test report

PBAT/CaCO₃ series blown film material

Items	M5000-5C	M5000-5C1	M5000-20B
Melt flow rate (g/10min)	2~3	2~3	3~5
Density (g/cm ³)	1.45	1.5	1.3
Longitudinal tensile strength (MPa)	20MPa	15MPa	20MPa
Longitudinal elongation at break (%)	≥400	≥300	≥200
Heat sealing performance	Edge sealing force ≥15N/15mm	Edge sealing force ≥15N/15mm	/
Fields of application	Beverage bags, supermarket shopping bags, pet pickup bags	Milk tea bags, rubbish bags	Packaging film (benchmarked LDPE film)
Implementation standards	GB/T38082-2019, ASTM D6400, EN13432, GB20197		
Typical blown film process	Processing temperature 150-155°C		



Beverage bag



Shopping bag



Industrial dustproof film

III. Product Line: Fully degradable straw materials

Items	Type	Use temperature	Product Characteristics
Straight straws	Cold Drinking Straws H8000-1G	0~50°C	<ul style="list-style-type: none"> • Fully biodegradable • Balanced stiffness and toughness • Excellent freezing resistance: -15°C freezing for 4h • Excellent aging performance: double 85 aging 24h, pinch does not crack
	Heat-resistant straw H8000-1A	0~70°C	
	Crystalline heat-resistant H8000-1H	0~80°C	
Curved Straw	Heat-resistant straw H8000-1D	0~70°C	<ul style="list-style-type: none"> • Small smoke, low odour • Implementation standards: GB/T 20197, GB/T 4806.7, GB/T 41008
	Cold drink straw H8000-1E	0~50°C	



Note: H8000-1H typical crystallisation process: temperature 75-90-95-95-100°C

H8000-3 Series: Fully Biodegradable Thermoforming Material

Items	H8000-3A	H8000-3B	H8000-3C	H8000-3E	H8000-3K
Components	PLA	PLA	PLA/Talc	PLA/Talc	PLA/Talc
Density (g/cm ³)	1.25	1.25	1.35	1.4	1.4
Transparency	Highly transparent	Transparent	Non-transparent	Non-transparent	Non-transparent
Melt strength	good	excellent	excellent	excellent	excellent
Use temperature (°C)	0~50	0~100	0~120 (microwave heating)	0~90	-10~50
Mould temperature (°C)	15~35	95~105	95~105	15~35	15~35
Application fields	Food packaging products, such as blister lunch boxes, trays, plates, cups, etc.				



Disposable products

- ❑ Disposal knife fork spoon
- ❑ Hotel consumable



Injection-molded thin-walled products

- ❑ Packing boxes/trays
- ❑ Disposable cups



Durability

- ❑ Melamine alternatives
- ❑ Children's tableware



III. Product Line: Disposable injection molding grade materials

Types	Product Descriptions	Use temperature	Product Characteristics
H8000-2D	Annealed crystalline heat-resistant	0~90°C	<ul style="list-style-type: none"> • High flowability, wide molding window • Balanced stiffness and toughness • High whiteness
H8000-2C	Biomass composite materials	0~90°C	<ul style="list-style-type: none"> • High flowability, wide molding window • Balanced stiffness and toughness • High whiteness



Disposable knife, fork and spoon



Disposable bamboo powder composite products



Disposable Fruit Fork

Note 1: Material implementation standards: GB/T 20197, GB/T 4806.7

Note 2: Typical application areas: disposable knives, forks and spoons, fruit forks, coffee sticks, hotel consumables

III. Product Line: Injection-molded thin-walled products

Types	Product Descriptions	Use temperature	Product Characteristics
H8000	Heat-resistant material	-10~90°C	<ul style="list-style-type: none"> • High fluidity, wide processing window • Balanced stiffness and toughness • Heat-resistant in one-step moulding
H8000-2G	Freeze-resistant material	-15~50°C	<ul style="list-style-type: none"> • High flowability, wide moulding window • Balanced stiffness and toughness • Resistant to freezing



Food container



Yogurt cup

Note 1: Melt finger: 40-50g/10min (190°C, 2.16kg)

Note 2: Recommended to use high speed injection moulding machine, injection temperature 180-210°C

Note 3: Typical application areas: thin-wall injection moulding of lunch boxes, bowls, cups, ice cream containers, yogurt cup

H8000-2A: Typical crystallized-in-mould heat-resistant material

◆ Product Characteristics

- High heat resistance (120° C)
- Short moulding period 30~60s
- High impact resistance, high gloss

◆ Injection Moulding Processes

- Drying: 100°C, 3~5h
- Injection temperature: 190~210°C
- Mould temperature: 95~105° C

◆ Typical Applications

- Melamine alternatives
- Daily necessity
- Children tableware
- Children toys



H8000-2P/2H: Typical durable injection moulding grade material

■ Product Characteristics:

- Completely biodegradable
- High impact resistance
- Balance of firmness and toughness
- Low shrinkage rate
- Colour Customisation

■ Fields of application:

- Household appliances shell, electronic appliances shell, children's toys, stationery



Vacuum cleaner parts



Autopen



Hotel storage boxes

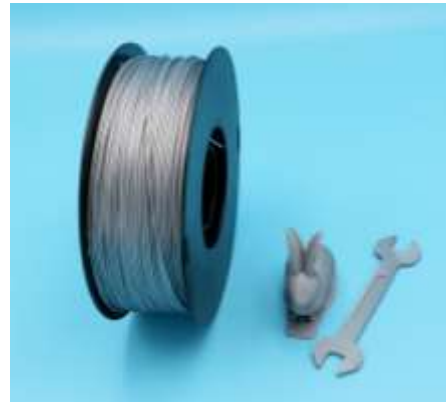
H8000-5 Series: PLA 3D Printing Materials

Serial No.	Pellet Type	Filament Type	Remark	Special Properties
1	H8000-5A	oPLA	semi-translucent	Good gloss and clarity
2	H8000-5D	oPLA+	toughened	Improved toughness of the material based on PLA, stronger lines
3	H8000-5B	oPLA-ST	ultra-tough	High impact resistance, high elongation at break, high bond strength, high printing accuracy
4	H8000-5J	oPLA-Metal	spray-free	Strong metallic glossy texture, no painting required
5	H8000-5S	oPLA-Silk	silk colour	Silky smooth feel, good mechanical properties and toughness, stable printing performance
6	H8000-5T	oPLA-Twinkling	sparkle	Glittering appearance
7	H8000-5M	oPLA-Marble	marble	Marble-like appearance
8	H8000-5L	oPLA-Luminous	luminous	Gorgeous glow-in-the-dark exterior effect
9	H8000-5Y	oPLA-Matte	matte	Matte surface effect, the surface is delicate and does not show the layer grain
10	H8000-5W	oPLA-Wood	lumber	With wood-like appearance effect, the surface is matte and delicate without showing the layer grain.
11	H8000-5F	oPLA-LW	lightweight	A material developed for aeromodelling, with a stable interlayer bond.

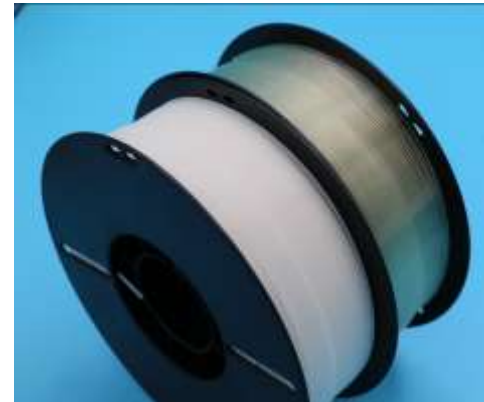
H8000-5 Series: PLA 3D Printing Materials



Silk colour



Spray-free Silver



Ultra-tough/transparent



Silk gold



silk colour





Thank you

