

**TOYO TOKAI ALUMINIUM HANBAI K.K.**

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We form beautiful relations,  
we aim to expand.

## Aiming to harmonize environment and technology

Aluminium is light, easy to process, and has electrical as well as thermal characteristics. It has sufficient resources and is also a clean metal, which is one of its features.

Toyo Tokai Aluminium Hanbai K.K. is seeking and expanding more possibilities of aluminium business in various areas by selling aluminium products such as aluminium foil and aluminium paste as a member of Toyo Aluminium Group.

Toyo Aluminium Group is one of the top makers of aluminium foil and aluminium paste, and the core company of the group is Toyo Aluminium K.K. Our group also contains our company, Toyo Aluminium Ekco Products Co., Ltd. and several companies. Now, each company of the group works jointly and aggressively for resolving the issues of environmental pollution, energy saving, resource saving, recycling and so on. We desire to make a contribution in terms of developing a harmonized society by applying environment-friendly aluminium in a wide range of areas.

The registered trademark symbol (®mark) means a registered trademark in Japan.



## It is used for a wide variety of capacitors as first class electronic material.

Aluminium as an electric material has exquisite features of electrical conductivity next to copper, no-magnetism, and relatively large electrical capacity. Especially, high-purity aluminium foil is used in a wide range of capacitors.



### ■ TOYAL-CARBO®

#### ● Features

- Surface area magnification effect  
→ It is more than twice that of current-edged foil capacity
- Surface resistance attenuating effect  
→ It suppresses a generation of thermal oxide film

#### ● Applications

Applications for electronic parts	Surface area magnification effect	Surface resistance attenuating effect
Electrodes for aluminium electrolytic capacitors	◎	○
Electrodes for functional solid polymer capacitors	○	◎
Electrodes and current collectors for electrical double-layer capacitors	○	◎
Current collectors for lithium-ion batteries	○	◎

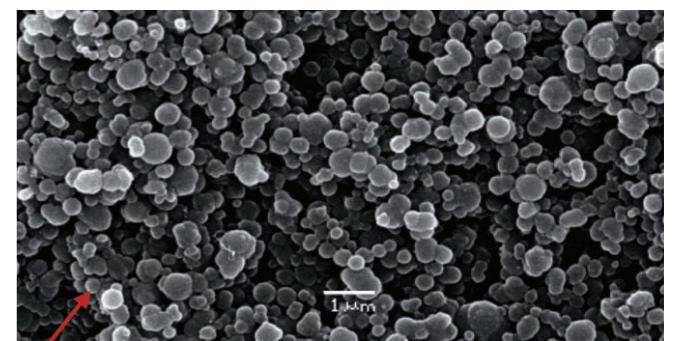
◎ : Highly important factors ○ : Important factors

#### ● Product specifications

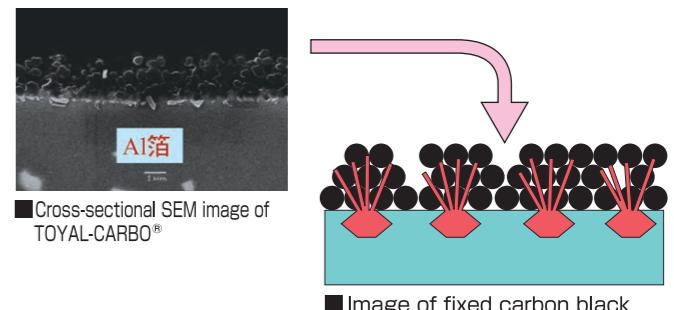
- Main composition (e.g.): 1μcarbon layer/50AL/1μcarbon layer  
\*Carbon layer 1~8μ(one surface) is available.  
\*AL 20, 30, 50μis standard (other thickness level is also available.)
- Product size: - [width] ~120mm × [length] ~1000mm



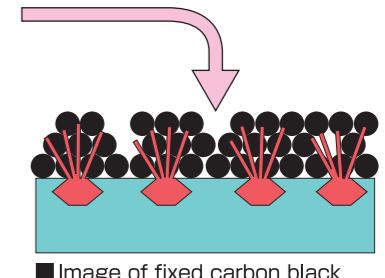
■ TEM replica image of TOYAL-CARBO®'s surface whisker



■ Surface SEM image of TOYAL-CARBO®



■ Cross-sectional SEM image of TOYAL-CARBO®



■ Image of fixed carbon black



## More and more rapid progress.

## New relation between aluminium and electricity.

Aluminium: an ideal electrical material, rust-resistant, readily-processable, heat-resistant, and a basic electric character. It can be widely used as a part of machinery, electronic parts, thermal reflective boards, and for vacuum deposition with our technology.





## Lots of new ideas, unlimited potential of packaging.

Our products have various properties with a combination of using aluminium foil, paper, cellophane, and resin film. They are hygienically qualified, maintain the humidity and dryness inside, and protect the inside from light and high temperatures. They have a protective function and are rich in ornament for more variety.

Filters out UV and heat rays, keeps aroma and moisture inside.

### ● Packaging material for medicinal products

(PTP, separated packaging) and foods

Aluminium foil has an excellent sealing capability, which keeps out bacteria, external air, and moisture under sanitary conditions. It preserves the aroma of products such as tea and coffee (when kept inside for a lengthy period), and it is great for the use of moisture exclusion for the packaging of medicinal products and dry foods. It also fulfills a great function of quality preservation and preventing component oxidation and transformation by light and heat insulation.



Appeal of goods and products through a beautiful appearance

### ● Rice bag material

Laminated material is used in a wide range of packaging, because it brings functionality and exquisite ornament from a variety of combinations and creativity. The charming features of goods and products appeal to customers through beautiful gloss, printing, colouring, and typing.



### Management of a hygienic environment

#### ● Packaging material for dairy goods

We make an adequate effort not to mix viable bacteria or fungus into the material used. In addition, we take all possible measures to ensure to detect dripping fungus and attached fungus in order to increase the state of hygiene during the production process.



### High-integrity function packaging material

#### ● Confectionery packaging material, disposable body warmer packaging material, medicinal product packaging material (cataplasma material), Lamination tube, and other packaging materials

We manufacture a large variety of packaging materials in combination with water vapour barrier property, gas barrier property, light blocking property, sealing property, tearing property, and mechanical property depending on the clients' needs under a sanitary environment.





## We support new logistics by making it easy for the customer to select and purchase.

Plastic and aluminium foil containers have great properties of food preservation and retaining moisture and aroma under a sanitary environment. Especially when considering logistics, they consistently make a reasonable contribution, from storefront display to refrigerator preservations. They are precisely great products to contain in the field of contemporary logistics.

Corresponds to freezing, burning, microwaving

### ● Heat-resistant paper cups

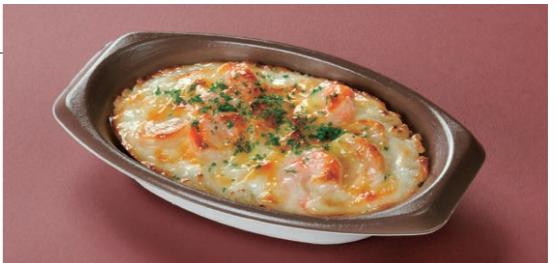
This is a food container made of paper, which is the best material for quick cooking by microwaving. We have two designs as ready-made products, and we can also comply with custom printing, depending on the manufacturing lot. Our paper containers have heat resistance, as well as a good record of frozen food and chilled food.



It conducts heat well and is good for cooking as a food container.

### ● Aluminium foil, Plastic container

Aluminium foil has heat-resistant properties in addition to other various characteristics. It is used as a pot, container, and Aluminium foil for ready-made foods or chilled/frozen foods in a wide variety of circumstances in the modern day.



Microwave-safe cups: great for adding colours to lunch-box

### ● Paper cases

Microwave-safe paper cases take a supporting role in lunch-boxes by adding colours either for personal use or for business purposes. Besides standard supply, we accept customized orders in terms of design, colour, and size, and we adjust paper thickness and interior plastic based on the situation.



## High purity aluminium protects materials against corrosion or sunlight.

Aluminium is used as a material of weather-resistant paint for a variety of preservations. Multi-layered aluminium paint preserves materials such as iron towers, bridges, vessels, or vehicles from sunlight, moisture, and corrosive constituents in the long run.

### Aluminium paste

Aluminium pigment pastry ink is made of high purity aluminium, and aluminium paint (metallic paint) is made of them. Aluminium multi-layered coating film protects coated objects from heat rays or light rays by reflecting 75-80 percent of them. It is weather-resistant and is used for prolonged cycles of repainting and reducing maintenance costs, as well as in a wide range of iron towers, iron bridges, tanks, vehicles, or vessels.



### METAX® (Metallic compound)

Injection of resinous material used by aluminium pigment ink.



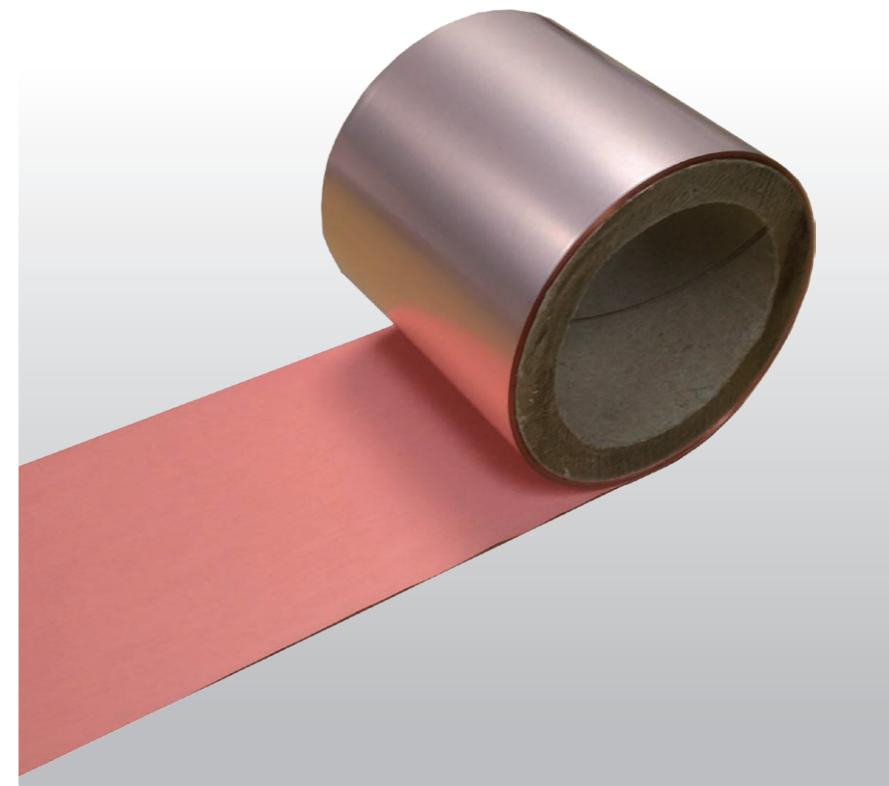
### Foreign film, domestic film

High qualified and affordable foreign film  
PET, OPP, VM-PET etc.



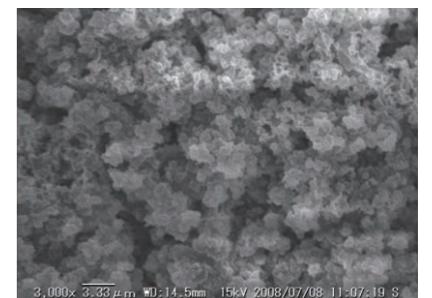
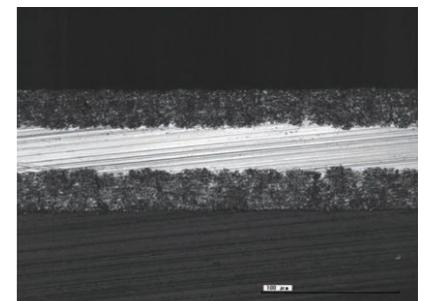
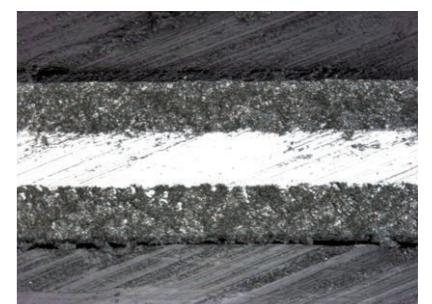
### Copper foil

High qualified and affordable electrolytic copper foil from Bangkok Industrial Laminate Co., Ltd. in Thailand



### Etching foil, anodized etched foil

Aluminium electrolytic capacitors are a requisite for a variety of fields, ranging from household electrical goods to industrial machines. We cover etching foil and anodized etched foil for those electrodes.



## New functional aluminium

Foil material expands the possibilities of design

### READ-MAX®

This is a ground breaking PTP (Press through Package) aluminium foil that makes it possible to scan barcodes without white colour, which is necessary on backgrounds. This allows our clients not to change the original design image and gives them the option of product differentiation by colouring.



Sophisticatedly fulfilling the requirement of high moisture-proof PTP

### AL-PRESS®

This is a perfect packaging material composed of double-sided aluminium foil for fulfilling the requirement of high moisture-proof PTP. Our aluminium container material has an overwhelming performance in terms of formability, stability, and sealing.



New material, hygienic and various in applications

### Ground-breaking water-repellent packaging material "TOYAL LOTUS®"

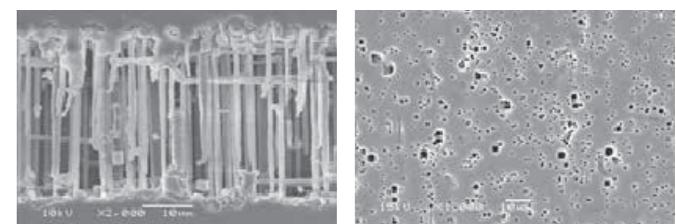
When opening a yoghurt package, one can always see that yoghurt sticks to the cover. Our dairy industry clients have received complaints from customers about children licking the cover of yoghurt, which makes them behave badly, or hands getting dirty. In order to solve this problem, we conducted research and investigation into the creation of an innovative packaging material. We received hints from the water repellence of lotus leaves and developed a ground breaking water-repellent packaging material, which has a three-dimensional reticulate fractal structure.



### TOYAL PASS®

TOYAL PASS® (perforated foil) is a functional material that has fine holes measuring 1 micron or less in diameter formed through the aluminium foil. It is currently used as the positive electrode current collector on lithium ion capacitors.

\* Lithium ion capacitors are attracting attention as a new type of energy device that combines the high capacity of lithium-ion batteries with the high output of electric double-layer capacitors. They are mostly used for automotive applications and as back-up power supplies. The use of this TOYAL PASS® means that the pre-doping of lithium ions can be carried out easily and it has also made a reduction in cell resistance possible.



Electron microscope observation of a cross section of TOYAL PASS®

Electron microscope observation of the surface of TOYAL PASS®

### Features

- The through-holes are formed perpendicular to the surface
- It is possible to control the diameter of the holes
- The number of through-holes is approximately  $1 \times 10^6$  holes /  $\text{cm}^2$
- The surface of the perforated foil is hydrophilic

Environmentally friendly, resource-saving inner packaging packing material stick.

### ECO LIFE STICK inner packaging

This can make candy or chewing gum separate easily from the packaging, and furthermore we can adjust the separation level based on the situation. This is a safe packing material under food hygiene criteria (enabled by the FDA). This can deal with high-speed packaging by fold retention ability of aluminium foil. Through our unique processing method, it allows you to reduce a cost for taking advantage of thin and light packaging design.

### Packing design example

Conventional products	ECO LIFE STICK	ECO LIFE STICK high peeling type
O P Printing	O P Printing	O P Printing
Aluminium foil	Aluminium foil	Aluminium foil
Adhesive layer	heat-resistant adhesive layer	heat-resistant adhesive layer
Release processed paper	Tissue paper	Tissue paper
	Release process	Release process
	(Contents)	(Contents)

### Physical property data

#### Peeling strength(N/25mm)

Standard type	High peeling type
Conventional silicon paper	ECO LIFE STICK
0.72	0.40

\* Measuring condition: 4-day preservation under 40°Cx90%RH, Load: approximately 0.4N/piece, tensile speed: 100mm/min, 90° separation

\* Contents: Soft candy

### Use application example Candy, chewing gum, or health foods etc.

\*The data is observed values at our company facilities and may vary under different conditions.



## Always aim to form new encounters between people and aluminium.

The role of Toyo Tokai Aluminium Hanbai K.K. is to unite the potential of aluminium as a material with (the customer's) demands in a variety of industrial fields and daily life. Therefore, we offer related products or packaging machineries for the adequate use of the strength of aluminium materials and products. We also propose solutions and provide information passionately. Upon request, we have made achievements by organizing sales order management systems and logistics for providing the right products at any time. Throughout our business and activities, we desire to introduce new people to aluminium, and from there, take a new step towards tomorrow.



■Osaka Office



■Tokyo Office

■Singapore Branch

### ■ Affiliate companies

#### ● Toyo Aluminium K.K.

Toyo Aluminium K.K. is a core company of the Toyo Group, jointly founded by Alcan Aluminium Limited, one of the world leaders in the aluminium industry and Sumitomo in 1931. Since the company was founded, they have sought for popularizing aluminium products into a variety of industrial fields and daily life, in order to contribute to the development of the society. In addition, they have a place in top manufactures of the field, aluminium paste (aluminium paint pigment) today.



■Yao Works



■Shinjo Works



■Hino Works



■Kanbara Works



■Chiba Works



■Gunma Works



■Shinjo Works (Gose)



■Chigasaki Works (Hagizono)



■Chigasaki Works (Shonan Yabata)

#### ● TOYO TOKAI ALUMINIUM HANBAI (Shanghai) Co., Ltd.

The company is a trading company established as an affiliate company of Toyo Tokai Aluminium Hanbai K.K. in Shanghai in January 2007. With a focus on companies in China, Hong Kong, and Taiwan, the company sells from materials for capacitors (aluminium foil, aluminium metallized paper and film, lead wire, delivery tape etc.) and electronic parts such as backseat for solar batteries to household commodities such as food or chemical processed foil, aluminium containers, plastic containers, paper products.



#### ● Toyo Aluminium Ekco Products Co., Ltd.

As downstream sector of Toyo Aluminium Group, the company promotes innovative product proposals that create new markets with consistent customer orientation, manufacturing and providing household commodities such as Aluminium foil, Range Panel™ and aluminium containers, plastic and paper package products for the use of food items.

