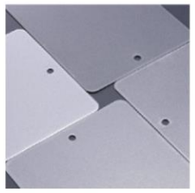
Material Issue

Innovation to Shape the Future

In order to respond to social challenges, potential problems, and changes in the market environment that have become apparent, the Advanced Technology Division and the New Business Creation Division have classified the target markets into the following three categories: “existing market,” “new market,” and “next-generation market,” and are devoting resources to research & development and commercialization for each category. When it is difficult to find solutions on our own, we actively promote open innovation through alliances with venture companies, universities, research institutes, and other organizations, both in Japan and overseas. We incorporate the concept of “Creating Shared Value (CSV),” deepen communication with our stakeholders, and work on development that can realize the creation of shared value with society. We also aim to lead the world with new ideas, being based on aluminium, but not limited to it.



Environmentally friendly coating solutions

Powdered paint does not use solvents, so it does not generate VOCs (volatile organic compounds), and can significantly reduce environmental impact. Toyal’s aluminium pigments for powdered paint use resin to encapsulate high-brightness aluminium flakes. This provides high chemical resistance, as well as a high metallic gloss, facilitating a sense of premium quality.

Developing aluminium pigments that contribute to reducing environmental impact, and actively submitting proposals to customers

Tomie Toyal’s aluminium paste is widely used around the world as metallic pigments for automotive and other paint, as well as printing ink. In recent years, there has been growing demand to reduce environmental impact, including contributions to the reduction of CO_2, VOCs (volatile organic compounds), and waste. To respond to this demand, at Toyal, we are leveraging advanced surface treatment technologies to develop and supply pigments for water paints and thermal insulation aluminium pigments, as well as aluminium pigments for powdered paints that do not use solvents, etc.

These products address customer needs, featuring a high metallic gloss as well as excellent chemical resistance, while also contributing to solving social issues such as climate change.

Nagano We contribute to preventing air pollution and improving the workplace environment for frontline painting operations by limiting the use of VOCs in pigments for water paints. Recently, demand has been growing from industries besides the automotive industry.

Pigments for thermal insulation paint reflect sunlight and heat more effectively than existing products, and limit temperature increases in buildings and structures. I feel there is growing interest in products for thermal insulation applications, as we have received active questions from the likes of construction companies using paints when we exhibited these products at exhibitions, etc. In direct sales, we focus on paint manufacturers, but when making proposals, we consider “what would be best for customers,” based on constant awareness of the needs of users of end products and society in general.

Kazuhiro Tomie
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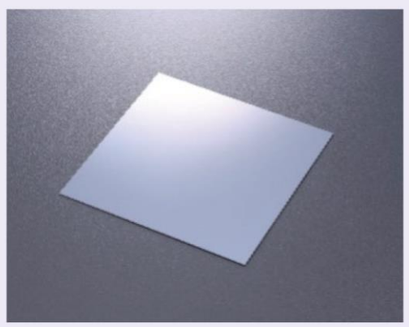
Reclamation of aluminium container production waste for containers

We use comparatively high-purity aluminium for rolled materials for aluminium containers. Minor changes in composition have a major impact on the characteristics of rolled aluminium. Accordingly, waste generated from production processes was previously mostly reused for cast metal and other materials without the strict composition management requirements of rolled materials. We are focusing on recycling 100% of production waste generated in-house and transforming it into new aluminium containers with sufficient performance. Horizontal recycling is an established process for aluminium beverage cans, but recycling from aluminium foil to aluminium foil has not really been popularized. We will continue our research to develop practical applications, while resolving issues one by one.

Aluminium container made with 100% recycled materials

R&D on new “SiGe/Si wafer” substrate for high-efficiency solar cells

In R&D focused on on-silicon multi-junction solar cells selected by the New Energy and Industrial Technology Development Organization (NEDO), we are developing technology for more efficiently converting large amounts of solar energy into electricity by combining different materials on SiGe/Si wafers researched and developed by Toyo Aluminium K.K. There are substantial costs associated with high-efficiency solar cells, so we will contribute to lowering these costs by using our wafers. If this technology becomes established, it will enable us to save weight and space for installation. We will contribute to the spread of renewable energy and CO_2 emissions reduction.



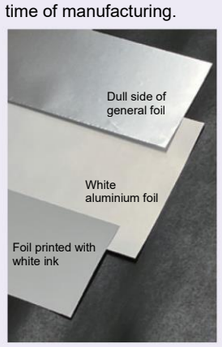
SiGe/Si wafers

Recycling Technology / W Cycle

A “Plastic Identification Mark” is displayed on aluminium foil packaging materials for food and pharmaceuticals, and they are collected as plastic container resources. These packaging materials, however, consist of aluminium foil and resin that is merged. This makes separation difficult, so they are incinerated after collection and are not recycled as resources.
So we have invented a technology for separating aluminium foil and resin.
W Cycle is a cutting-edge technology that enables us to recycle each of the materials in aluminium foil packaging materials.
At present, we have completed designs for recycling processes, and we plan to put these processes into operation at a small-scale trial plant in the second half of 2025.

White aluminium foil

We have successfully colored aluminium foil white, creating white aluminium foil, through an inventive uneven surface on the foil and the use of diffused light reflection. Often, white ink is used as a base color on aluminium foil to ensure that printed patterns, characters, and other designs are visible on various types of aluminium foil packaging. Using this white aluminium foil, however, means that coloring with white ink is unnecessary, enabling us to contribute to reducing the environmental impact. Additionally, it enables us to make the structure of packaging materials simpler, thus contributing to increasing the potential for recycling.
We are currently developing mass production technology, taking into consideration the reduction of environmental impact at the time of manufacturing.



	White aluminium foil	General aluminium foil
Total reflection rate (%)	80	81
Regular reflection rate (%)	2	61

Image of reflection

The regular reflection rate is low, meaning it appears white