NEWS RELEASE

Teijin Develops New Thermosetting Carbon Fiber-reinforced Plastic Combining Self-healing Functionality with Recyclability

Tokyo, July 21, 2026: Teijin Limited announced today that it has developed a thermosetting, long carbon fiber-reinforced plastic (CFRP) that combines a heat-activated self-healing function with high recyclability, while offering mechanical properties equivalent to those of conventional CFRPs.

Damaged areas of the new material can be repaired by being heated for a short time at a specified temperature, enabling repair rather than replacement and thereby helping to extend product lifetime and reduce resource consumption.

Further, Teijin's CFRP enables recycling through a simple chemical decomposition process, thereby contributing to circularity. A wide range of applications can benefit from the strength and light weight of this CFRP material, including aircraft, automobiles and sporting goods.

There is growing demand for products that help to reduce greenhouse gas (GHG) emissions throughout the entire life cycle. However, CFRPs, made by impregnating carbon fiber with thermosetting resin, cannot be melted or remolded. Also, much of the waste generated after use is incinerated or landfilled, making it a priority to develop new CFRPs that can reduce environmental impact.

To date, Teijin has worked to reduce GHG emissions and cut waste through initiatives such as the development of Tenax Next, its carbon fiber brand based on circular feedstocks. Now, Teijin has leveraged its renowned polymer material design technologies, cultivated over many years, to develop new resin that retains the excellent mechanical properties of conventional materials while enabling recycling through resin decomposition and featuring a heat-activated self-healing function. The company incorporated this resin into its new a circular thermosetting CFRP, which helps reduce environmental impact while providing the strength and rigidity of conventional CFRPs.

Technology Functionality

Self-healing through heating

If the resin layer of the CFRP becomes damaged, it can easily be repaired by heating it at a prescribed temperature for a short time (Fig. 1). Thanks to this capability, CFRP material that has deteriorated can continue to be used, avoiding premature disposal and waste generation.

Recyclability through remolding

Once molded, conventional CFRP materials cannot be remolded because the impregnated thermoset resin does not melt or flow, even when heated. In contrast, Teijin's new CFRP product exhibits flowability after molding when exposed to heat within a

specified temperature range, making it possible to recycle the material through compression molding and other methods.

Carbon fiber retrieval/reuse through resin decomposition

Conventionally, separating carbon fiber from recovered thermosetting CFRP requires thermally decomposing the resin by combustion in a high-temperature furnace exceeding 400°C over a long period. This energy-intensive method imposes a significant environmental burden. Teijin's newly developed CFRP can be decomposed by soaking it in a specific chemical solution, making it possible to easily separate the long carbon fibers from the thermoset resin. This simpler, shorter method enables the carbon fiber to be reclaimed with low environmental impact and excellent efficiency (Fig. 2).

Figure 1: Self-healing via heat
Cross-sectional view of the CFRP (left) and ultrasonic inspection results (right)
(Top: Before repair; Bottom: after repair)

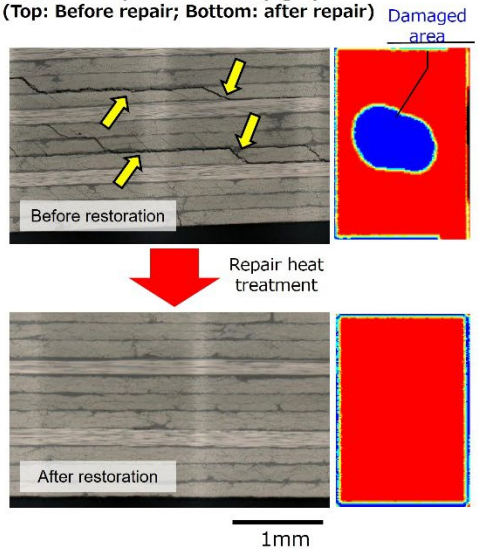
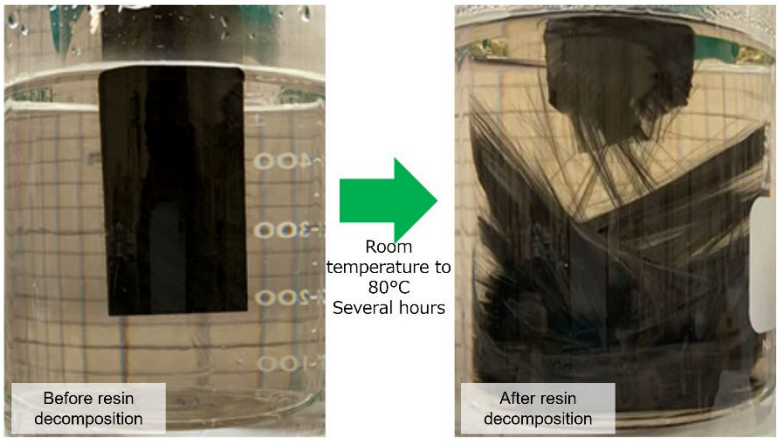


Figure 2: Carbon fiber reclamation through resin decomposition
After CFRP is soaked in a specific chemical solution, the resin decomposes, making it possible to easily separate and recover the long carbon fibers.
(Left: CFRP before decomposition; Right: carbon fibers after decomposition)



Note: These results were obtained, in part, through the Strategic Innovation Promotion Program (SIP) "Building a Circular Economy System" of the Council for Science, Technology and Innovation (CSTI), Cabinet Office (implementing agency: Environmental Restoration and Conservation Agency, Independent Administrative Institution) (JPJ012290).

Teijin aims to begin providing samples of this developmental CFRP product in the course of 2028, and will continue to advance research and development in collaboration with universities and research institutions. The company will seek to expand the use of this CFRP in a wide range of applications, focusing primarily on aircraft, automobiles, industrial machinery and other use cases where there is strong demand for weight reduction, improved durability and reduced environmental impact.

Furthermore, with an eye toward future mass production and social implementation of the new CFRP product, Teijin will promote development that optimizes every aspect, from material formulation and component design to recycling processes, while advancing application development and building a supply chain in collaboration with partner

companies. In practical terms, Teijin Carbon is seeking opportunities for joint development projects.

Teijin will continue to strive to minimize the negative environmental and social impacts associated with its business activities and in parallel increase the performance of our solutions in the applications of our customers. This reinforces Teijin's long-term vision to support the society of the future.

About the Teijin Group

Teijin (TSE: 3401) is a global group that co-creates value with Customer-Driven businesses across the Apparel & Industries, Healthcare & Life Solutions, Electronics & Energy, and Specialty Materials domains. Established in 1918 as Japan's first rayon manufacturer, Teijin today comprises some 125 companies employing approximately 15,700 people. Teijin is committed to its Purpose: Pioneering solutions together for a healthy planet. Teijin works together with employees and external partners to achieve its Long-Term Vision: To be a company that supports the society of the future. Teijin posted consolidated revenue of JPY 873.2 billion and total assets of JPY 920.1 billion in the fiscal year ending March 31, 2026.

About Teijin Carbon

Teijin Carbon is a subsidiary of the Teijin Group, specialized in the production and development of carbon fibers and carbon fiber-based materials. Under the carbon fiber brand Tenax™ and Tenax Next™, Teijin Carbon offers high-performance material solutions for industries such as aerospace, automotive, energy, electronics, civil engineering and sporting goods. Teijin Carbon's products enable the creation of lightweight yet incredibly strong components – weighing about 75 percent less than steel while offering 10 times its strength. They also excel in fatigue resistance, corrosion resistance, and chemical stability, making them ideal for a wide range of applications. Teijin Carbon has production facilities in Japan, the United States, Germany, Vietnam and sales offices all around the world. For further information please visit: www.teijincarbon.com.

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