Change in the Resin Material Used for Canisters

Toshiki Tsuboi, Norihisa Yamamoto, Masamitsu Hayakawa

Adopting polypropylene with low CO_2 emissions effectively reduces CO_2 emissions

Cars release a lot of hydrocarbons (HC) into the air while driving, parking, and refueling. These exhaust gases are collectively referred to as evaporative emissions, or EVAP. Regulations that limit their emissions have been created in various countries and regions (EURO6 in Europe, LEV-III in the Americas, etc.). The canister is an eco-friendly product that follows these rules. It is installed in the pathway between the fuel tank and the atmosphere. It stops the release of HC into the outside environment by adsorbing gasoline vapors that have vaporized inside the tank onto activated carbon. The canister is mostly made of activated carbon and resin. PA66 (polyamide) has typically been used for this resin.

This initiative aims to further improve environmental performance by replacing this resin material with PP-GF (glass-reinforced polypropylene), which has a simpler manufacturing process and lower CO_2 emissions.

This material is as strong as or stronger than traditional PA66. Because its deformation (how much it bends when under load) is small, the thickness of the plate has also been reduced.

One anticipated concern was the permeability of gasoline vapors, but we created new testing conditions that mimicked our customers and markets. We also verified that the levels were within the regulation limits and replaced the materials. This has made the product more competitive. It now produces 36% less CO_2 and 9% less mass per unit.

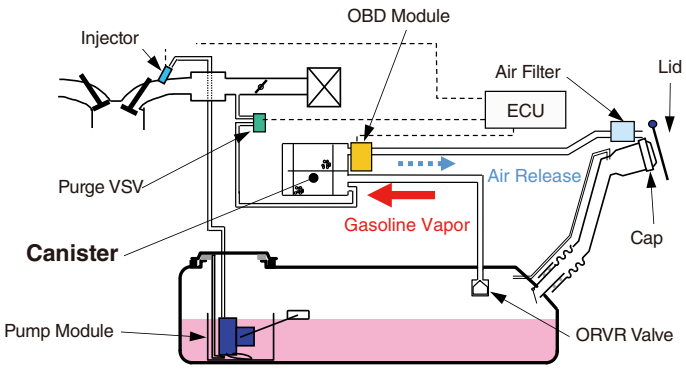
Highlights of Achievements

01

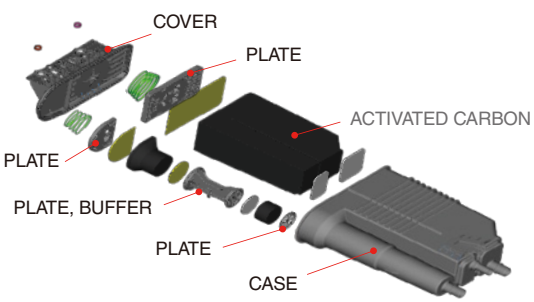
Use materials that produce less CO_2

We replaced the resin material of the canister in the fuel tank system (see the figure below) from PA66 (polyamide) to PP-GF (glass-reinforced polypropylene), which greatly reduced CO_2 emissions and mass.

〈 Fuel tank system (ORVR) 〉



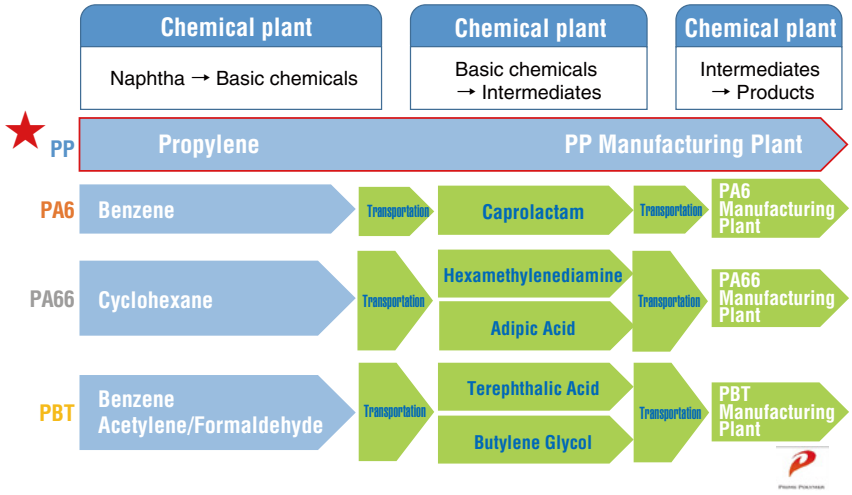
〈 Resin replacement parts 〉



02

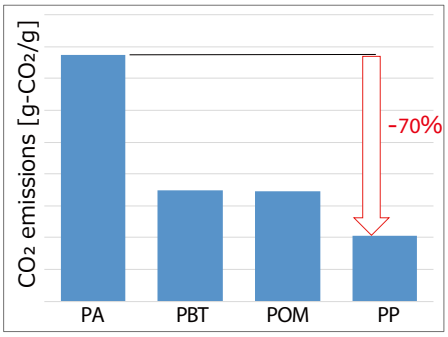
Characteristics of alternative materials

PP-GF (glass-reinforced polypropylene) has a simpler manufacturing process than conventional PA66 and other materials. It also offers advantages in terms of CO_2 emissions per material.

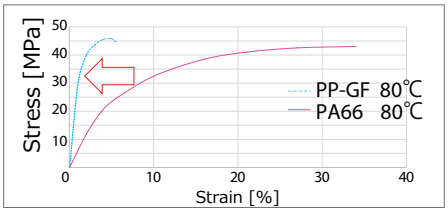


◇ The data listed in this document are representative examples of measurements obtained under specific conditions.
Provided by Prime Polymer Co., Ltd.

〈 CO_2 emissions by resin material 〉

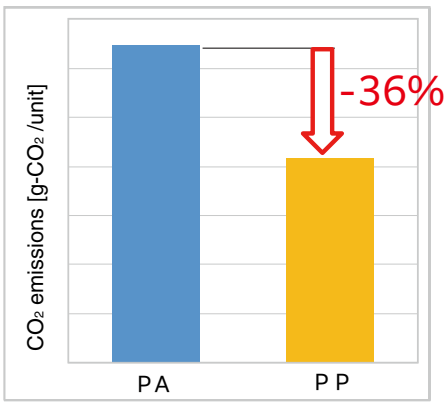


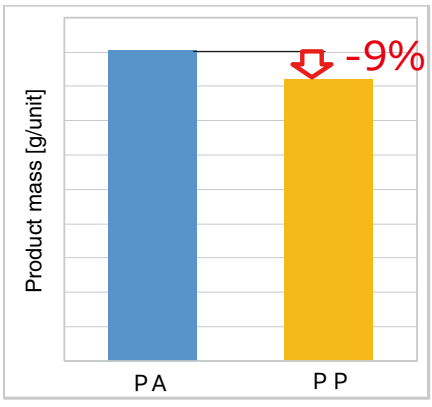
〈 Strength properties comparison 〉



Results (Problem Solving)

■ Significant reduction in CO_2 emissions and mass achieved.





Achievements

■ Domestic phase-in: Scheduled to begin in April 2025 with a gradual transition.

■ Scheduled to expand to North America and China in the future.