Plastic & the Automobile Trifecta:
Performance, Fuel Efficiency and Safety

Ever wonder what materials our cars and trucks* are made of? How much metal, glass, and plastic are in your favorite vehicle? Those questions and more are answered in a new report titled, "Chemistry and Automobiles." Car fans can dig into it at

plasticmakers.org/chemistryinautos.

Report highlights:

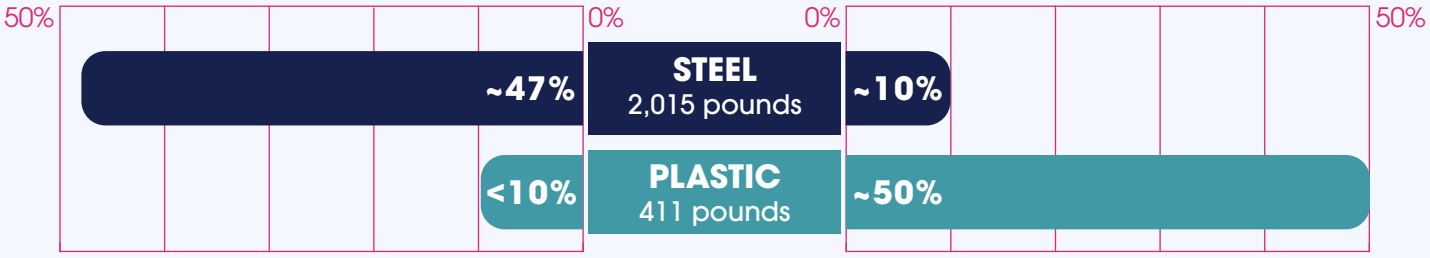
"Lightweight plastic and polymer composites play a critical role in today's automobiles, as well as in the transition to next-generation vehicles, as they enable vehicle weight reduction that helps automakers meet increasingly stringent fuel economy standards, while enhancing safety for drivers, passengers, and pedestrians."

The Automobile Trifecta

Plastic and polymer composites are innovative, modern materials that significantly contribute to:

PERFORMANCE **FUEL EFFICIENCY** **SAFETY**

Weight VS Volume



Plastic and polymer composites are really strong yet lightweight.

Ford Motor Company

"Few innovations provide a more wide-ranging performance and efficiency advantage than reducing weight. All factors of a vehicle's capabilities – acceleration, handling, braking, safety, efficiency – can improve through the use of advanced, lighter materials."

* Includes both passenger automobiles and light-duty trucks (pick-up trucks, minivans, and sport utility vehicles) in North America in 2021.

The Value Of Plastic In Autos Is Rising

PLASTIC/POLYMER COMPOSITES

2016 **$540** PER AUTO ▸ 2021 **$710** PER AUTO

The Amount Of Plastic In Autos Also Is Rising

PLASTIC/POLYMER COMPOSITES

2021 **411** Lbs PER AUTO ▲ UP **16%** SINCE 2012

Over a dozen types of plastic are used in our cars (**Click here** to see what's being done to recycle that plastic.)

Advanced Lightweight Materials Improve Auto

Performance

HOODS:
Can improve a vehicle's aerodynamics, while also contributing to the overall design aesthetic.

OPTIC CABLES:
Enhanced illumination of the interior, more accurate GPS data, and highly responsive ABS sensors.

CHASSIS:
Providing lighter weight, higher stiffness, and lower cost than traditional materials such as steel.

Fuel Efficiency

WEIGHT REDUCTION:
Is a key driver in boosting fuel efficiency, reducing emissions and lowering costs.

AVERAGE FUEL EFFICIENCY:
Real-world miles per gallon is now 25.3 compared to 19.6 MPG 20 years ago.

IN TODAY'S CARS YOU'RE SURROUNDED BY CUSHIONING PLASTIC.

Safety

ESSENTIAL SAFETY FEATURES:
Are made possible by chemistry and plastic. From bumper to bumper, plastic helps keep the vehicle – and the passengers inside – safe.

ACCORDING TO NHTSA:
Seat belts – which are typically made from polyester – saved nearly 15,000 lives in 2017.

FIBER-REINFORCED POLYMER COMPOSITES:
Can absorb 4X the crush energy of steel while plastic foams and other polymer composites provide additional impact protection.

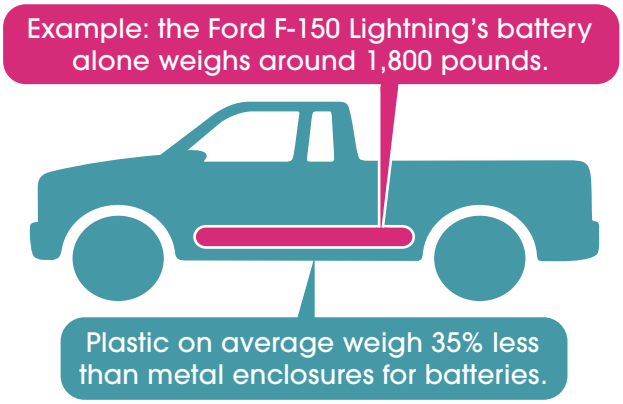
Electric Vehicles Are Surging In Popularity. Plastic Helps.

In general, EVs are significantly heavier than their gasoline-powered counterparts, primarily due to the battery weight.

Even more so than in ICE (internal combustion engine) cars, plastic plays a significant, helpful role in these heavy EVs.

Given their light weight, plastic and polymer composites can help to offset added weight from the introduction of autonomous and advanced propulsion mechanisms, including batteries and hydrogen fuel cells.

Compared with metal assemblies, large-format all-plastic housings enable cycle time reductions and contribute to lighter vehicle weight, thus extending the range of electric vehicles.



Helping Keep EV Batteries Safe

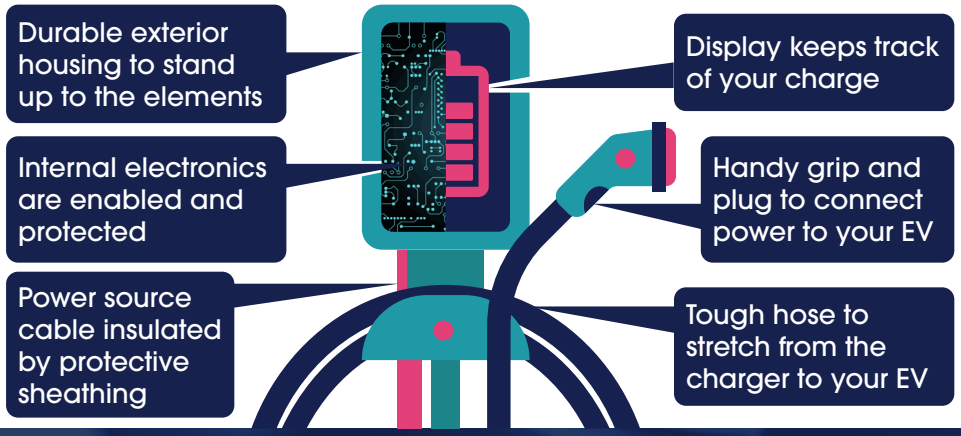
Desirable Properties

Due to their insulating properties, plastic and polymer composites are sought-after materials for various components of electric vehicle batteries, including battery casings and enclosures.

Advantage: Plastic

Replacing metal components with plastic aids in weight reduction, reduces corrosion, provides design flexibility, and helps keep batteries safe during collisions.

And all those charging stations?



Plastic and other products of chemistry can be used for a wide array of components within the larger structure of alternative fueling stations and electric vehicle charging ports, such as charger housings, covers over front displays or touchscreens, lenses, connectors, light guides, and other components.

The 2023 report "Chemistry in Automobiles" captures the role that lightweight plastic and other chemistry products play in the automobile trifecta.

Read the Report: **plasticmakers.org/chemistryinautos**