



POPULAR PLASTICS & PACKAGING

India's premier journal for the plastics, polymer and packaging industries

REPRINT

Plastics in electric vehicles

Nandkishor Sarolkar
Sarvesh Engineering,
"OMKAR" Bungalow, Plot no 9,
Shridhar colony, Karve nagar,
Pune 411052

*To get a copy of the issue or to subscribe to
PPP write to subscription@colorpub.in*

Reprinted from Popular Plastics & Packaging MARCH 2019

Plastics in electric vehicles

Nandkishor Sarolkar

Sarvesh Engineering,
"OMKAR" Bungalow, Plot no 9,
Shridhar colony, Karve nagar,
Pune 411052

INCREASING demand for electric vehicles owing to growing environmental awareness supported by innovation, government initiatives, and investments made by OEMs has resulted in a technological revolution in the global automobile industry. The need for electric vehicles propels allied sectors such as plastics, an essential material required in the manufacturing.

Manufacturers need lightweight materials to develop electric vehicles, which is the primary driver of the global electric vehicle plastics market. Environmental concerns are expected to increase the requirement for electric vehicles, thereby driving the electric vehicle plastics market over the forecast period. With a shift in consumer need toward automobiles which contribute to fewer greenhouse gas emissions, highly fuel-efficient electric vehicles and their variants are being manufactured by almost all major automakers owing to the improving year-on-year sales of this product, directly influencing the development of the electric vehicle plastics market. Another contributing factor is the decline in the prices of raw materials used in the manufacture of electric vehicles.

In terms of material, electric vehicle plastic is categorized into the following types: PP, PE, ABS, PE, PVC, PA, Nylon 6, Polycarbonate, PVB, and other engineering resins.

On the basis of application, the market is segmented into the interior, exterior, lighting & electric wiring, and under the hood divisions.

Battery electric vehicles are a rapidly expanding segment in the electric vehicle plastics market, driven by factors such as increasing innovation, environmental concerns, and stringent emission regulations.

The global electric vehicle plastic market has witnessed modest growth in 2015 and is expected to follow the same trend during the coming years. Asia Pacific dominates the electric vehicle plastic market and has emerged as a hub for electric vehicles in recent years, with China and Japan being the leading players. Governments in APAC are also trying to provide incentives to support the demand for electric

vehicles. The electric vehicle plastics market in North America and Western Europe are flourishing at a healthy rate as a result of the increasing adoption of non-polluting vehicles as a means of transportation.

Key players operating in the global electric vehicle plastics market include BASF SE, Formosa Plastic Corporation, U.S.A, Evonik Industries, and Mitsui Chemicals, Inc.

As the demand for electric vehicles (EVs) rises over the next several years, plastic manufacturers may benefit from the growth potential for the cars' minor, non-moving components. An analysis from Frost & Sullivan, a market research firm, projects EV production to grow at a compounded annual growth rate of more than 80% through to 2017 in Europe and North America. Correspondingly, the demand for plastics used in these vehicles also will grow correspondingly. Plastics for EVs are driven by lightweighting trends which, in turn, are fuelled by the need to improve EV mile range. EVs are typically characterized by huge batteries which add to the overall weight of the vehicle and affect the mile range. To compensate for the battery weight, metals are increasingly being substituted by plastic.

The report, titled "Strategic Analysis of Plastics in the Electric Vehicles Market in Europe and North America," finds that the market has earned \$500,000 in 2010 and estimates that sales will reach \$73 million in 2017.

It is estimated that just over 200 tons of plastics were used in these applications in 2010 and more than 23,600 tons will be used in 2017. Plastics have huge potential in some of the minor, non-moving components, such as energy recovery devices, cooling pipes, pumps, fans, and casing materials. Plastic currently is preferred for cooling pipes and fans, but for other components, such as energy recovery devices (pedal and pump) and casing materials, plastics have low to moderate penetration,

Electric vehicle plastics market: market dynamics

Electric vehicle plastics market is primarily driven by the trend of light-weight plastic applications as a manufacturing

element. Application of light-weight plastics in electric vehicle results in enhanced fuel efficiency along with increasing the range of battery electric vehicle (BEV). BEV is expected to be the largest contributor to electric vehicle plastic markets which in turn will boost up the growth of global electric vehicle plastics market. Electric vehicle plastics market is further expected to witness an increasing demand owing to its performance competency as compared to metal. Plastic's attributes such as carbon emission reduction and less dependency on petroleum drive the electric vehicle plastics market.

Electric vehicle plastics market: segmentation

Electric vehicle plastics market can be segmented on the basis of electric vehicle type which includes:

- Battery Electric Vehicle (BEV)
- Hybrid Electric Vehicle (HEV)
- Plug-in hybrid Electric Vehicle (PHEV)

Electric vehicle plastics market can be further segmented on the basis of plastic material used in manufacturing, which includes:

- Polypropylene (PP)
- Polyethylene (PE)
- Acrylonitrile- Butadiene Styrene (ABS)
- Polyurethanes (PE)
- Polyamide (PA)
- Polycarbonate (PC)
- Polyvinyl Butyral (PVB)
- Polyvinyl Chloride (PVC)
- Others

Electric vehicle plastics market can be segmented on the basis of application, which includes:

Interior

- Seats
- Arm Rest
- Bumpers
- Head Rest
- Others

Exterior

- Car Body
- Lights
- Others

Among the plastics types used in electric vehicles, polypropylene (PP) constitutes a significant share in the electric vehicle plastics market. PP is widely used in electric vehicles for interior applications such as seats, car body, bumpers, head and arm rest. Polypropylene attributes such as light-weight, flexibility and improved strength stir up the demand for the material thereby, boosting up the electric vehicle plastic market.

Electric vehicle plastics market: regional sentatioegmn

Based on the regional coverage, electric vehicle plastics market has its presence in North America, Latin America, Western Europe, Eastern Europe, Asia-Pacific excluding Japan, Japan and Middle east and Africa. North America followed by Western and Eastern Europe hold a significant share in the global electric vehicle plastics market in terms of its volume. Asia-Pacific is projected to grow at the highest CAGR over the forecast period. China and Japan contribute significantly to the global sales and production of electric vehicles thereby increasing the demand for electric vehicle plastics market.

Electric vehicle plastics market: key players

Some of the key players in Global Electric Vehicle Plastics market are BASF SE, Covestro AG, E. I. Du Pont de Nemours and Company, Eastman Chemical Company, Evonik industries AG, Lanxess AG, Lyondell Basell Industries Holdings B.V., Mitsubishi chemical holdings corporation, Rochling group, Saudi Arabia Basic Industries Corporation (SABIC), Solvay SA, Sumitomo Chemical Co., Ltd. and The Dow Chemical Company.

Plastic in Electric Vehicles Market is expected to grow at CAGR of 43.03% to reach \$6274.31 million by 2023. Asia-Pacific dominates with major share and growth in the Plastic in Electric Vehicles Market. Europe is the dominating market holding a share of approximately 32% in 2017. The European market generated revenue of \$251.56 million in the year 2017. The market is expected to grow at a CAGR of 43.92% to reach revenue of \$2235.46 million by 2023. Germany is the leading region in the European market, where Germany summed up 39100 passenger cars and light commercial vehicles. Asia-Pacific market is the fastest growing market with a CAGR of 48.23%.

The APAC market gained a value of \$ 212.10 million in 2017, and the market is estimated to reach revenue of \$ 2249.86 million by 2023. China is the leading manufacturing country and with high processing industries. The major contribution of China is a factor behind the fastest growth of the APAC market. The U.S. is expected to propel the demand for plastic material electric vehicles in the coming years.

Market Dynamics

Drivers for plastics in EV

- Automotive plastics provide maximum mass reduction potential
- Advanced automotive materials offer significant emission reduction
- Automotive plastics improve vehicle design and aesthetics
- Growing demand from BRIC countries

Factors affecting the plastics consumption

- Capital cost and infrastructure
- Material cost

Opportunities

- Use of composites & PMMA in passenger car production

The Main Challenge in the higher plastics use is the development of lightweight & environment friendly automotive plastic use of plastic material in interior application of passenger car drives the global Plastic Materials Market for Electric & Hybrid Vehicles. Interior application dominated the market with 43.0% of total plastics demand in passenger cars, followed by exterior application with 34.0% in 2014. The major plastics which are widely used in manufacturing interior components are polypropylene, ABS, PET, and PVC.

Plastic materials market for electric & hybrid vehicles, by Application and by Region

Interior

- Dashboard
- Seats
- Interior trim
- Car upholstery
- Others

Exterior

- Bumper
- Body
- Exterior trim
- Others

Under the hood

- Battery
- Engine
- Transmission
- Others

The Plastic Materials Market for Electric & Hybrid Vehicles is projected to grow at a CAGR of 27.82% from 2016 to 2021, to reach a market size of USD 1.49 billion by 2021. The major drivers of this market are the supporting government policies increasing sales of electric and hybrid vehicle, stringent emission regulations, light weighting demand to achieve fuel efficiency, demand for better ergonomics and other factors.

Plastics used for Interior application is the fastest growing segment globally, in terms of value. Interior applications includes dashboard, seats, interior trim, car upholstery and others. Around 50-55% of plastic is used in the interior of a

About the Author



Mr. Nandkishor Sarolkar, is having over 40 years of experience in industry with over 20 years international exposure. His services to industry include turn key projects in rigid plastic packaging, Post consumer plastic recycling projects, Renewable energy projects with special emphasis on Solar module manufacturing, Electric vehicle component and EV conversion kit for retrofitting.

car which is majorly made up of polypropylene (PP), Acrylonitrile- Butadiene-Styrene (ABS), Polycarbonate (PC) and Polyvinyl Chloride (PVC). Plastics in the interior of car allows designers to have enhanced flexibility in styling, manufacturing and assembling auto components with reduced costs and weight reduction. Additionally, the plastics are increasing the luxury and comfort inside the cabin.

Polypropylene (PP) is the fastest growing plastic material type used in electric and hybrid vehicles. the average percentage of polypropylene employed in a passenger car is increasing owing to the materials excellent characteristics such as better heat resistance, protection from U.V. radiations, high strength, flexibility and other factors. According to LyondellBasell Industries (one of the key plastics, chemical and refining companies) an average passenger car employs 0.066 tons (60 kg) of polypropylene which is around 25-30% of total plastic employed in a passenger car. Thus, the material contributes a larger percentage in the passenger car plastics market.

Asia-Oceania is estimated to dominate the Plastic Materials Market for Electric & Hybrid Vehicles, and is projected to grow at the highest CAGR during the forecast period. China is putting all efforts to become leader in the electric and hybrid Vehicles market with the central government trying to become hub for electric and hybrid Vehicles manufacturing. The local players includes BYD, Chery, Zolte and Kandi Technologies which dominate the market. The other key country Japan, as of 2015 has sold 150,000 electric vehicles and has 40,000 charging points where the electric vehicles can be recharged. Japan is the only country whose charging point's number exceeds petrol stations (35,000), according to Asian Correspondent. Such factors make Asia-Oceania as the dominant electric and hybrid Vehicles market, which influences the plastic materials market for electric and hybrid Vehicles. Benefits like maximum mass reduction and significant emission reduction are one of the major driving factors for plastic materials market for electric & hybrid vehicles. ■

Information on your new products, equipments and processes

You are invited to submit information about new products, equipments, and processes, developed and offered by you to the Indian market. Such writeups are entertained for publication without any cost.

Don't miss this opportunity to promote your new products.