

## Epoxy solution for e-transportation

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Recently there are lots of new approaches in e-transportation industries such as EV/FCEV, PAV, UAM, High speed Train, Ships as well as aerospace in terms of composite, molding, coating, and adhesives.

For better long range battery efficiency, light weighting is essential but there are lot more issues are required for e-transportation industries such as Environmentally friendly system, Fast and Mass production system, high performance cured properties, natural bio based components, recycling and Non FST as well as lower total cost.

Epoxy resins are also under development to follow or to meet these requirements.

High performance new chemical structure epoxy resins and curative are developed and commercialized.

Composite parts of e-transportation need to be designed for available coating system and weatherable exposure stable properties and safe protection form the accident. The mass production capability with proper process and reliable cost are basic requirement for e-transportation.

Repairment technology and Recycling technology will be very important subject for sustainability in composite part of e transportation.

Since EV/FCEV getting more popular and increasing its volume with light weighting, assembling technology between nonferrous metal and composite materials or ferrous metal need to be improved. Adhesive (Taping, paste, Glue) should be designed for better adhesion with special designed chemicals such as toughened epoxy or improved chemical structure for nonpolar surface substrates' adhesion.

In case of EV/FCEV, Epoxy encapsulation & potting system, Thermal Adhesive and Structure adhesives can be applied for Battery pack. Epoxy encapsulation & potting system, Thermal potting materials and Thermal adhesives can be applied for charger and inverter. Epoxy based laminating adhesives and Molding compound can be applied for Motor core.

Bio based epoxy resins and hardener are also required to avoid ecological hormone issue (non-BPA) and to meet carbon neutral policy or regulation. There are lot of approach to develop natural bio-based epoxy. There are

some of commercialized products, but it's required to develop the special formula with modification and suitable process to get high performance of reasonable cured properties.

To get 100% bio carbon epoxy resin with reasonable Tg and mechanical properties, new concept chemical products are under development.