Editorial corner – a personal view

Potential use of ‘green’ composites in automotive applications

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Nowadays, the eco-awareness of the public along with legislative actions force the manufacturing industry to make use of renewable materials, recycling-friendly design and ‘green’ production and processing technologies. Great efforts are in progress to solve this challenge in a cost efficient way. It is important to minimize the usage of traditional petroleum-based materials in various engineering applications. Natural/bio-fiber composites (bio-composites) are emerging as a viable alternative to glass fiber reinforced composites, especially in automotive applications where lightweight construction is imperative to reduce the fuel consumption and related environmental pollution. Recently, the automakers have attempted to reduce the amount of manmade fibers by using natural fibers. The latter are lighter, less expensive than glass for example and even offer additional benefits over manmade fibers, such as sound absorption. As a consequence, non-structural parts of vehicles, such as front and rear bumpers and interior trim components were already produced by using renewable fibers as reinforcements.

Furthermore, the automotive industry is under pressure from sides of both the lawmakers and potential buyers requiring environment-friendly cars. Companies, like Mercedes-Benz, Toyota, Audi and Ford, already made great contributions to this need in car series. Epoxy matrix with jute fiber reinforcement was built in as door panels in some vehicles. Claims on the use of 100% environmental – friendly materials cars are already released by some manufacturers. Polylactic acid (synthesized from sugar cane and

sweet potato), reinforced with kenaf fibers, is a promising material in many applications. Polyurethane with high renewable content, reinforced by mixed flax/sisal fibers is well suited as door trim panels of high acoustic damping. Research and development works are in progress to use bamboo, kenaf, flax and wheat straw, as reinforcements, for bio-based and biodegradable resins such as polybutylene succinate and polylactic acid with the target applications of interior components.

Moreover, soy-based foams are foreseen for seats’ and arm rests’ cushioning. Bio-based epoxy resins are also gaining importance as matrices in automotive thermoset composites. Bio-based composites provide the necessary structural strength and acoustic performance, contribute to lightweight design (thereby reducing the fuel consumption), lower the production costs, fulfill the passenger safety requirements – and all these via guaranteeing the biodegradability. Nevertheless, there is still much to do to make our cars ‘greener’!

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