

# **Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry**

HeeJune Kim, Research Fellow

Automotive Composites and Components Division, LG Hausys R&D Center, Korea

E-mail: heejune\_kim@lghausys.com

A top-down approach from engineering requirements of an automotive component to development or selection of composite materials could increase the possibility of commercialization thanks to clearer and easier performance and cost targeting than bottom-up approach. In this aspect, automotive components suppliers can be more beneficial than dedicated materials suppliers in the development of composite materials for their own target components. In Korea, some suppliers of automotive composite components try to internalize and customize their polymer matrix composites (PMCs) and manufacturing processes in order to optimize weight, performance and cost competitiveness.

In many cases, the competitiveness of polymer matrix composites based components can be obtained from enhanced functional integrity (via high design freedom) and manufacturing complexity reduction by combining different reinforcing fiber lengths. Depending on the engineering requirements of a component, one can mix among no fibers, short fibers, long fiber and continuous fibers for component manufacturing processes such as injection and compression molding.

In order to have performance enhancement, long fiber thermoplastics and continuous fiber thermoplastics should be added in the material portfolio in addition to conventional compounds (no-fiber and short-fiber ones). On the other hand, in order to reduce parts number reduction, and thus cost reduction, design freedom using the conventional compounds should be also considered.

In this article, in terms of materials, long fiber thermoplastics by direct compounding (LFT-D) and continuous fiber thermoplastics (UD Prepreg) will be addressed in terms of technologies applied in the development. Also, in terms of components development, mix use of different fiber lengths (including no-fibers and short fibers) in the injection or compression molding process will be overviewed and explained with various case studies. Also, technical issues related to use of two different compounds/composites will be briefly addressed.

## Biography

Dr. Kim holds a research fellow position in LG Hausys, Korea where he is charge of automotive composite materials and components development. He has a master and doctoral degrees in mechanical engineering department of Seoul National University, especially in composite manufacturing processes for high performance thermoplastic composites. After that, he spent for more than 6 years in US at the University of Delaware Center for Composite Materials as a postdoctoral fellow and research associate where he focused on manufacturing process for both thermoplastic and thermosetting composites materials which were mainly defense and aerospace related R&D projects.

Now he is LG group for cost-effective and mass producible composite materials and components for automotive industry. Dr. Kim has 32 internationally registered patents and 18 international journal papers. He was also awarded two times in 2012 and 2017 in JEC Composites Show for lightweight, economically viable and mass producible composite solutions in structural and exterior related automotive components.