

iGCAuto: Innovative Graphene-Based Polymer Composite Materials for Automotive Applications

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The global automotive industry is currently facing great challenges as responsibility for increasing CO₂ emissions, lack of strong decarbonisation targets, fuel consumption, and safety. It is widely viewed as being the industry in which the greatest volume of advanced composite materials will be used in the future to produce light vehicles. However, in recent decades, cars have become larger and heavier with new generations. The main drivers of the weight increase are the improved safety and comfort requirements. Striving for reduced weight as the only objective will not necessarily result in a reduced environmental impact of the future vehicles: Another two key drivers need to be pursued at the same time, namely affordability and life cycle impact minimisation.

iGCAuto is part of the Graphene Flagship WP10, dedicated to nanocomposites, and specially focused on automotive applications of graphene. The project is researching in the field of the Graphene Related Materials (GRM) science and technology in a unique direction for large scale automotive applications towards safer, greener and energy efficient vehicles. Main target is provide Europe's automotive industry with highly competitive innovative lightweight graphene-based material solutions and the necessary capabilities to design, simulate, manufacture and assemble very lightweight, CO₂ and energy efficient and safe vehicles (EESVs). The development of novel graphene composites materials and their potential applications in automotive industry has been investigated and discussed in this project, towards safer and greener transport.

To achieve the objective, there have been prepared and characterized GRM thermosetting and thermoplastic composites, after the optimization of their processing methods. These hierarchical composites can be used as components in the vehicle body. Apart from their structural functions; proved with the enhancement of the mechanical properties, we have also obtained great improvements in thermal and electrical conductivity; showing the opportunities of obtaining, in industrial way, new multifunctional materials, not only with structural capabilities but also electrical and thermal conductors.¹

References

- [1] Progress in polymer science 36 (2011) 638-670.