

Electrospinning: From Design and Processing to Advanced Nanomaterials and Applications

Nano-engineering highly toughened fibre reinforced polymer composites by interleaving electrospun nanofibres for advanced applications

Lode Daelemans^{1*}, Timo Meireman¹, Ives De Bare², Hubert Rahier³, Wim Van Paepegem² and Karen De Clerck¹

¹Department of Textiles, Ghent University, Technologiepark 907, B-9052 Zwijnaarde, Belgium

²Department of Materials Science and Engineering, Ghent University, Technologiepark 903, B-9052 Zwijnaarde, Belgium

³Department Materials and Chemistry, VUB, Pleinlaan 2, B-1050 Brussels, Belgium

*Lode.Daelemans@UGent.be

Main body

Fiber reinforced polymer composites are the material of choice for designing applications which require a high strength and stiffness at minimal weight such as aerospace structures, wind turbines or ultralight vehicles. However, delamination between the reinforcing plies remains a major problem as it limits further breakthrough of these materials. Recently, interleaving electrospun nanofibres between the reinforcing plies has proven to be a viable interlaminar toughening method which can significantly limit the occurrence of delamination failure in composite materials [1,2]. This presentation will give a thorough insight into the relationship between the electrospun nanofibre properties and the resulting tough composites, and as such, allow for engineering novel and damage resistant nanofiber toughened composites.

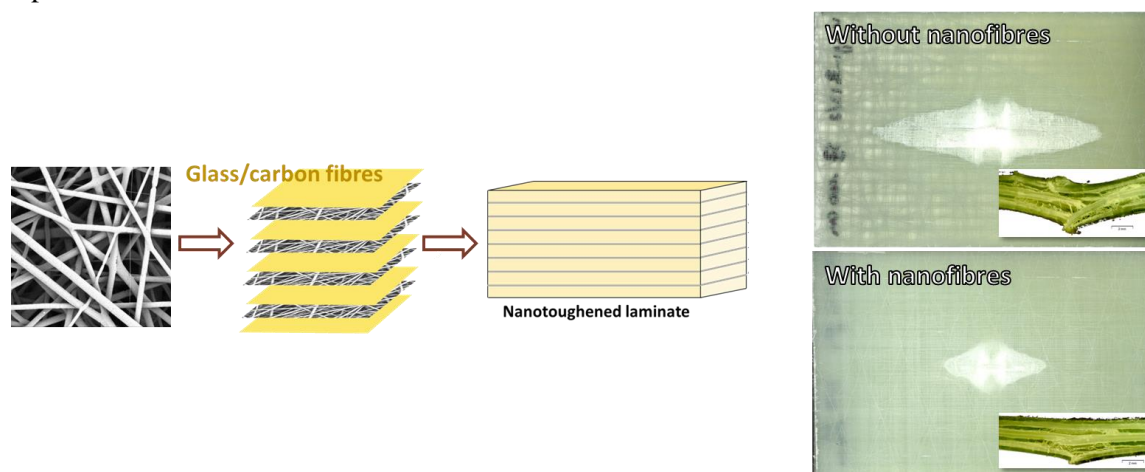


Figure 1: Nanotoughened composites with interleaved nanofibres show better impact resistance.

References

- [1] L. Daelemans et al., *ACS Appl. Mater. Interfaces* 8 (18), 11806-11818 (2016).
- [2] L. Daelemans et al., *Compos. Sci. Technol.* 117, 244-256 (2015)