

Effect of different types of electrospun polyamide 6 nanofibres on the mechanical properties of a carbon fibre/epoxy composites

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Abstract

Delamination and brittle matrix fracture has since long been a problem of fibre reinforced composites. Recently, the incorporation of nanofibre veils has been shown as an effective method for improving mechanical properties of these composites, without causing problems during impregnation and without negatively affecting other properties [1], [2]. These nanofibers thus have potential to serve as through-the-thickness reinforcing agents in woven composites. The effect of electrospun nanofibrous veils made of two different type of polyamide 6 on the mechanical properties of carbon fibre/epoxy composites has been investigated. The nanofibres were incorporated in the carbon fibre/epoxy composite as stand-alone interlayered structure. Incorporation of polyamide increases the mechanical properties of the composites. For composites with one PA6 nanofibre veil in the middle thickness position of the composites, between the carbon fibre plies, the stress at failure during the flexural mechanical tests increases between a 19 % and 42 % as a function of the physico-mechanical properties of the

PA6 employed in the veils preparation. The analysis of the fracture indicates that the veil hinders the crack propagation in the composites. Furthermore, G_{IC} value increases between 20 and 44 % for composites modified with a veil of the different PA6 employed. This increment is due to the crack propagation across the PA6 veil, which result in a high energy absorption of the veil.

References

- [1] Van der Heijden, S.; Daelemans, L.; De Schoenmaker, B.; De Baere, I.; Rahier, H.; Van Paepegem, W.; De Clerck, K. *Compos. Sci. Technol.* 104, (2014) 66-73.
- [2] Daelemans, L.; Van der Heijden, S.; De Baere, I.; Rahier, H.; Van Paepegem, W.; De Clerck, K. *Compos. Sci. Technol.*, 124, (2016) 17-26.

Figures

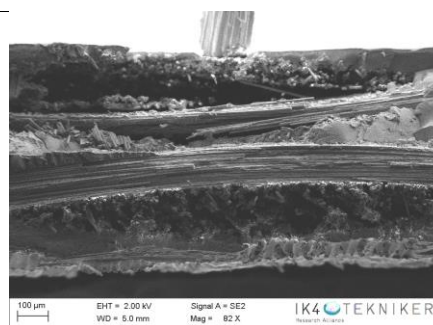


Figure 1: SEM of the composite with a veil of PA6 Ultramid

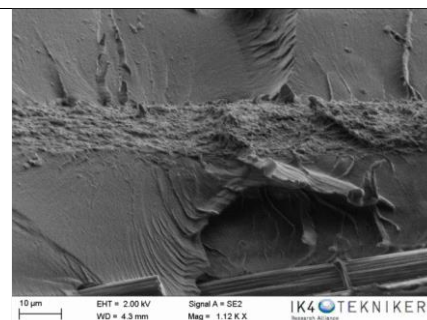


Figure 2: SEM of the veil of PA6 Ultramid within the composite