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Author: <ce:author id="aut0005"> H.N. Dhakal<ce:author id="aut0010"> Z.Y. Zhang<ce:author id="aut0015"> R. Guthrie<ce:author id="aut0020"> J. MacMullen<ce:author id="aut0025"> N. Bennett



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Development of flax/carbon fibre hybrid composites for enhanced properties

H.N. Dhakal^{*a}, Z.Y. Zhang^a, R. Guthrie^b, J. MacMullen^a, N. Bennett^a

^a Advanced Polymer and Composites (APC) Research Group

University of Portsmouth, School of Engineering,

Anglesea Road, Anglesea Building, PO1 3DJ, UK.

^b Vertu Ltd., Beacon Hill Road, Church Crookham,

Hampshire, GU52 8DY, UK.

* Corresponding author. Tel: + 44 (0) 23 9284 2582; fax: + 44 (0) 23 9284 2351.

E-mail: hom.dhakal@port.ac.uk (H. N. Dhakal)

Abstract

Uni-directional (UD) and cross-ply (CP) cellulosic flax fibre epoxy composites were produced by hybridising UD carbon fibre prepreg onto flax system. A compression moulding technique was used to produce both flax and carbon/flax hybridised laminates. The effect of carbon fibre hybridisation on the water absorption behaviour, thermal and mechanical properties of both UD and CP flax specimens were investigated by means of water absorption, tensile, thermogravimetric analysis and flexural testing. The results showed that water absorption behaviour of hybrid samples are markedly improved compared to those without hybridisation. Similarly, the thermal stability, tensile and flexural properties of the hybrid composites are significantly improved in comparison with UD and CP flax composites without hybridisation. The experimental results suggest that cellulosic flax fibre reinforcement contributed to improve the toughness properties by promoting crack propagation whereas the carbon fibre contributed in improving thermal stability, water absorption behaviour and the overall strength and the stiffness of the hybrid composites.

Keywords:

Hybrid composites; Cellulosic fibres; Mechanical properties; Compression moulding

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