

Carbon fiber/carbon nanotube reinforced hierarchical composites: Effect of CNT distribution on shearing strength - DTU Orbit (09/11/2017)

Carbon fiber/carbon nanotube reinforced hierarchical composites: Effect of CNT distribution on shearing strength

The strength and fracture behavior of carbon fiber reinforced polymer composites with carbon nanotube (CNT) secondary reinforcement are investigated experimentally and numerically. Short Beam Shearing tests have been carried out, with SEM observations of the damage evolution in the composites. 3D multiscale computational (FE) models of the carbon/polymer composite with varied CNT distributions have been developed and employed to study the effect of the secondary CNT reinforcement, its distribution and content on the strength and fracture behavior of the composites. It is shown that adding secondary CNT nanoreinforcement into the matrix and/or the sizing of carbon fiber/reinforced composites ensures strong increase of the composite strength. The effect of secondary CNTs reinforcement is strongest when some small addition of CNTs in the polymer matrix is complemented by the fiber sizing with high content of CNTs. (C) 2015 Elsevier Ltd. All rights reserved.

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