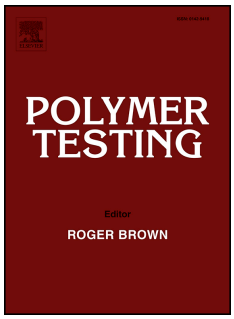

Research on carbon fiber/epoxy interfacial bonding characterization of transverse fiber bundle composites fabricated by different preparation processes: Effect of fiber volume fraction

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Test Method

Research on carbon fiber/epoxy interfacial bonding characterization of transverse fiber bundle composites fabricated by different preparation processes: Effect of fiber volume fraction

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Abstract

The transverse fiber bundle (TFB) test has recently been implemented to evaluate carbon fiber/epoxy bonding strength. Due to limitations of the specimen manufacturing process, the fiber volume fraction has a particular significant influence on the TFB test results. TFB specimens with different fiber volume contents were prepared by different fiber impregnation processes. A multiscale model with different fiber volume contents was established to simulate the damage process. Both experimental and analytical results show that TFB bonding strength increases with decrease of fiber volume content. Hence, the fiber volume fraction effect should be considered when using the TFB test as a characteristic of interfacial strength.

Keywords: Carbon fiber; Fiber/matrix bond; Finite element analysis (FEA); Micro-mechanics; Fiber volume fraction