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Keywoerd: A. Carbon fibres; A. Carbon black; B. mechanical properties

Abstract

The interfacial properties between carbon fiber (CF) and matrix play a key role in the mechanical properties of carbon fiber composites. To improve the mechanical properties of fibers/epoxy composites without sacrificing tensile strength of base fibers, carbon black (CB) was introduced onto the surface of CFs by chemical vapour deposition (CVD). The distribution of CBs on the fiber surface and the change of the surface roughness were analysed, using scanning electron microscopy (SEM) and atomic force microscope (AFM). Raman spectroscopy indicated that the defects of CF surface were repaired by CB. The wettability and surface energy of modified CFs increased obviously in comparison with those of the untreated CFs. Meanwhile, a significant increase of interlaminar shear strength (ILSS), interface shear strength tests (IFSS) and impact property were achieved in the 5-min-modified CFs, which was 22.0, 44.4 and 22.7%, respectively. In addition, the tensile strength (TS) of modified CFs showed a slight increase compared with that of untreated CFs.