Growth of vertically-aligned multi-walled carbon nanotube films on carbon fiber cloth

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Some investigations have been done on the preparation of carbon nanotube/carbon fiber (CNT/CF) hybrid composites by growing CNTs onto CF. The growth of CNTs on the surface of CF is a promising approach for improving mechanical, electrical and thermal properties of structural composites [1-3]. However, there are several problems on growing CNTs on CF substrate such as: (a) the catalysts of transition metals can easily diffuse into the CF; (b) mixed phases of carbon materials can be formed on the surface of the CF; (c) the CNTs may grow only locally on the surface of the substrate [2,3,4-8]; and (d) the synthesis conditions used for the CNT growth may cause the introduction of defects that can significantly degrade the CF properties. In this work, it is shown that CNT forests can easily be grown on amorphous Si interface deposited on the surface of CF to obtain a multiphase CNT/Si/CF. In this method, Si acts as a barrier, preventing the Fe catalyst to diffuse into the CF. Tensile test were carried out to verify if the mechanical strenght was affected by growth process.

Keywords: Carbon fiber, carbon nanotubes, camphor, amorphous-silicon interlayer

Work supported by FAPESP

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