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Qingliang Shen, Hejun Li, Wei Li, Qiang Song

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Realizing the synergy of carbon nanotubes and matrix microstructure for improved flexural behavior of laminated carbon/carbon composites

Shen Qingliang, Li Hejun*, Li Wei, Song Qiang*

State Key Laboratory of Solidification Processing, Carbon/Carbon Composites Research Center, Northwestern Polytechnical University, Xi'an 710072, China

Abstract

Carbon nanotubes have been electrophoretically deposited on carbon fibers to improve the flexural performance of laminated carbon/carbon composites. The synergy effect between carbon nanotubes and different textured pyrocarbon matrix has been investigated. Mechanical testing results showed that after introducing nanotubes into low-texture-matrix and high-texture-matrix composites, their flexural strength increased by 13.9 % (up to 197 MPa) and 89.6 % (up to 309 MPa), respectively. Excessively strong interface bonding in low texture matrix C/C resulted in the deterioration of the in-situ fiber strength and the strengthening effect provided by CNTs. While the fiber-pyrocarbon interface in high-texture-matrix composites was relatively weak, the introduction of CNTs showed a better strengthening effect because of the optimization of the fiber-matrix interface. Additionally, CNTs

* Corresponding author. Tel.:+86-29-88495004; fax:+86-29-88492642.
E-mail address:lihejun@nwpu.edu.cn
* Corresponding author. Tel.:+86-29-88495004; fax:+86-29-88492642.
E-mail address: plusring@163.com