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Beibei Chen, Xiang Li, YuhanJia, Xiaofang Li, Jin Yang, Fengyuan Yan, Changsheng Li

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Beibei Chen [a,*], *Xiang Li* [a], *YuhanJia* [a], *Xiaofang Li* [a], *Jin Yang* [a], *Fengyuan Yan* [b], *Changsheng Li* [a]

[a] *School of Materials Science and Engineering, Institute for Advanced Materials, Jiangsu University, Zhenjiang 212013, China*

[b] *State Key Laboratory of Solid Lubrication, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, 73000, China*

Abstract

A novel hybrid material composed of micro-carbon fiber (CF) and hexagonal MoS_2 nanosheets was prepared via a one-step hydrothermal method. The hybrid simultaneously had both lubricating and reinforcing effects to improve friction and wear properties of polyimide (PI). More importantly, MoS_2 nanosheets decorated onto the surface of CF increased the interfacial adhesion between CF and the PI matrix. This enhanced the hardness and thermal stability, and was also favorable for transferring stress from the matrix to CF during friction and wear process. Accordingly, the PI/CF-MoS_2 composite exhibited outstanding tribological properties. Also, its friction coefficient and wear rate were only 0.24 and $2.01\times10^{-6}mm^3/Nm$, respectively, which were lower than those of PI, PI/CF and PI/MoS_2; this suggested CF-MoS_2 hybrid was a promising additive for enhancing the tribological properties of polymers.

[*]Corresponding author: B.B. Chen (chenbb@ujs.edu.cn). Tel/fax: +86 511 88783268